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Special Issue: Mood and Anxiety Disorders, Part I

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Introduction

2014 Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component

J. Toews, BA; L. McRae, BSc; S. O'Donnell, MSc

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Mood and anxiety disorders are the most common types of mental disorders in Canada, yet there has been a lack of up-to-date information on the impacts of these disorders and approaches used to manage them. To address these gaps, the Public Health Agency of Canada (PHAC), in conjunction with Statistics Canada and other external experts, developed the 2014 Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component (SLCDC-MA).[1]

The 2014 SLCDC-MA is the only national survey to collect information on the experiences of Canadians with professionally diagnosed mood and/or anxiety disorders. This survey provides detailed information on a wide variety of topics related to mood and anxiety disorders including disorder-attributable impacts on usual and work-related activities; medical and individual approaches used to manage them; and barriers to care and self-management. Furthermore, as a cross-sectional follow-up survey to the 2013 Canadian Community Health Survey (CCHS), responses were linked to those from the CCHS, creating an even richer dataset that includes additional health-related information such as comorbidities, lifestyle behaviours, and health determinants.

By way of this special theme issue on mood and anxiety disorders, we are pleased to introduce three original articles that PHAC, in collaboration with external experts, has developed using data from the 2014 SLCDC-MA. These articles provide new information on the experiences of Canadian adults with professionally diagnosed mood and/or anxiety disorders, with a specific focus on the key sociodemographic factors known to influence health-related outcomes.

The 2014 Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component: a methodological overview[2], by O'Donnell et al., is a methodological overview of the 2014 SLCDC-MA that includes a description of the survey's objectives, content development, qualitative assessment, target population, sampling strategy, data collection and processing, data quality, confidentiality and ethical considerations. In addition, it includes an examination of the sociodemographic characteristics of the final sample. The information presented is intended to enhance the reader's interpretation and understanding of the results found in other original articles that use 2014 SLCDC-MA data.

Health status, activity limitations, work-related restrictions and level of disability among Canadians with mood and/or anxiety disorders[3], by Loukine et al., provides a comprehensive overview of the general and mental health status, usual and work-related activities and level of disability among Canadian adults with mood and/or anxiety disorders. The findings shed light on the magnitude of the health-related impacts of these disorders and identify subpopulations at greatest risk of severe disability. Furthermore, the results support the role of public health policy and programs in improving the lives of those living with these disorders with particular emphasis on those with co-occurring (concurrent) mood and anxiety disorders.

Correlates of well-being among Canadians with mood and/or anxiety disorders[4], by Orpana et al., examines factors associated with well-being (measured by self-rated mental health and life satisfaction) among Canadian adults with mood and/or anxiety disorders. The results provide a better understanding of these factors and demonstrate that well-being is achievable even in the presence of a mood and/or an anxiety disorder. In addition, the findings show that healthy coping strategies and strong perceived social support are important correlates of positive well-being.

Future analyses will deal with topics related to the management of mood and/or anxiety disorders including time to diagnosis, self-management through exercise and/or physical activity and use of prescription medication and psychological counselling. The topics chosen for this issue and future studies were informed by PHAC's surveillance priorities and Canada's strategic priorities as outlined in *Changing Directions, Changing Lives: The Mental Health Strategy for Canada.*[5]

The 2014 SLCDC-MA is the first survey to provide information about the experiences of Canadian adults with professionally diagnosed mood and/or anxiety disorders using a population-based household sample. We anticipate that the original articles in this special theme issue will be of interest to a wide audience, including policy and decision makers, mental health and mental illness professionals, non-governmental organizations, members of the general public and people living with a mood and/or an anxiety disorder, as well as their families and caregivers. Furthermore, the findings offer insights into areas

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where further support or interventions may be needed and provide additional information for future public health research in the area of mental illness.

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The 2014 Survey on Living with Chronic Diseases in Canada on Mood and Anxiety Disorders: a methodological overview

S. O'Donnell, MSc (1); R. Cheung, PhD (1); K. Bennett, PhD (2); C. Lagacé, MSc (1)

This article has been peer reviewed.

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Abstract

Introduction: There is a paucity of information about the impact of mood and anxiety disorders on Canadians and the approaches used to manage them. To address this gap, the 2014 Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component (SLCDC-MA) was developed. The purpose of this paper is to describe the methodology of the 2014 SLCDC-MA and examine the sociodemographic characteristics of the final sample.

Methods: The 2014 SLCDC-MA is a cross-sectional follow-up survey that includes Canadians from the 10 provinces aged 18 years and older with mood and/or anxiety disorders diagnosed by a health professional that are expected to last, or have already lasted, six months or more. The survey was developed by the Public Health Agency of Canada (PHAC) through an iterative, consultative process with Statistics Canada and external experts. Statistics Canada performed content testing, designed the sampling frame and strategies and collected and processed the data. PHAC used descriptive analyses to describe the respondents' sociodemographic characteristics, produced nationally representative estimates using survey weights provided by Statistics Canada, and generated variance estimates using bootstrap methodology.

Results: The final 2014 SLCDC-MA sample consists of a total of 3361 respondents (68.9% response rate). Among Canadian adults with mood and/or anxiety disorders, close to two-thirds (64%) were female, over half (56%) were married/in a common-law relationship and 60% obtained a post-secondary education. Most were young or middle-aged (85%), Canadian born (88%), of non-Aboriginal status (95%), and resided in an urban setting (82%). Household income was fairly evenly distributed between the adequacy quintiles; however, individuals were more likely to report a household income adequacy within the lowest (23%) versus highest (17%) quintile. Forty-five percent reported having a mood disorder only, 24% an anxiety disorder only and 31% both kinds of disorder.

Conclusion: The 2014 SLCDC-MA is the only national household survey to collect information on the experiences of Canadians living with a professionally diagnosed mood and/or anxiety disorder. The information collected offers insights into areas where additional support or interventions may be needed and provides baseline information for future public health research in the area of mental illness.

Keywords: mood disorders, anxiety disorders, mental health impacts, disease management, survey methodology, health surveys, population surveillance, Survey on Living with Chronic Diseases in Canada

Highlights

- The 2014 Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component (SLCDC-MA) is the only population-based household survey to date that has collected information on the experiences of Canadians living with professionally diagnosed mood and/or anxiety disorders.
- A total of 3361 respondents (68.9% response rate) completed the survey, which covered a broad range of topics including diagnosis, impacts on usual and work-related activities, stress, sleep, social relationships, health professional contacts and recommendations, medication use, counselling and self-management practices.
- The information collected provides insights into areas where additional support or interventions may be needed. Survey findings also provide baseline information for future public health research in the area of mental illness.

Introduction

Mood and anxiety disorders are the most common mental health problems affecting Canadians.[1] In 2013, an estimated 3 million people (11.6%) aged 18 years or older reported having one or both types of disorder.[2] Mood disorders are characterized by the lowering or elevation of a person's mood and include depressive and bipolar disorders. Anxiety disorders are characterized by excessive and persistent feelings of worry and fear and include generalized anxiety disorder, specific phobias, social anxiety disorder, agoraphobia, obsessive-compulsive disorder, panic disorder and posttraumatic stress disorder.[3] Mood and anxiety disorders often co-occur[4-9] and their co-occurrence with other mental disorders (such as substance abuse disorder and impulse control disorder) is also common.[9-11]

The impairments associated with mood and anxiety disorders can be profound, interfering with activities of daily living and the ability to maintain employment,

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and disrupting relationships with friends and family.[3] Fortunately, professional care combined with active engagement in self-management strategies can reduce the impact of these disorders and improve the well-being of those affected.[12] However, many challenges remain regarding access to and receipt of effective treatments.[13] A large proportion of people with these disorders fails to seek care and remains undiagnosed. Among those who do seek care, it has been documented worldwide that a substantial proportion receives suboptimal treatment or no treatment at all.[14-17] Lack of knowledge, attitudes and/or beliefs and fear of the stigma of mental illness and its treatment are among the more commonly cited barriers to seeking care, while practical barriers such as time constraints, costs and access to mental health services are less frequently reported.[18,19]

At present, there is a lack of up-to-date information on the experiences of Canadians living with mood and/or anxiety disorders, and more specifically, the impact these disorders have on Canadians' usual and work-related activities and the approaches used to manage them. To address these gaps, the Public Health Agency of Canada (PHAC), in conjunction with Statistics Canada, conducted the 2014 Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component (SLCDC-MA).[20]

PHAC initiated the development of the SLCDC in 2006, as there was a lack of information directly attributable to particular chronic diseases or conditions. Specific data gaps identified included symptom control, health education, self-management, clinical care, prevention interventions and factors related to adherence and health behaviours. Between 2009 and 2011, the SLCDC collected data on hypertension, arthritis, chronic respiratory conditions and diabetes and, in 2014, it focussed on mood and anxiety disorders. These diseases and conditions were selected on the basis of their prevalence, their importance to public health and the priority surveillance work being done by PHAC.

As an introduction to a collection of original articles reporting on different aspects of Canadians' experiences living with a mood and/or an anxiety disorder using the 2014 SLCDC-MA, this article describes the survey objectives and methodology and examines the characteristics of the final sample.

Methods

The 2014 SLCDC-MA, a cross-sectional follow-up survey to the 2013 Canadian Community Health Survey (CCHS)–Annual Component, includes Canadians 18 years and older with self-reported, professionally diagnosed mood and/or anxiety disorders.[21] The CCHS, a cross-sectional annual survey, collects information related to various aspects of health in the Canadian household population including several self-reported, professionally diagnosed chronic conditions.[22] Therefore, the CCHS can be used to determine the prevalence of these chronic conditions in the Canadian population. As well, it serves as the sampling frame for the SLCDC and a source of additional sociodemographic and health information since responses from the SLCDC are linked to the CCHS.

The main purpose of the 2014 SLCDC-MA was to provide detailed information on a wide variety of topics related to the experiences of Canadians living with professionally diagnosed mood and/or anxiety disorders, which is not feasible in a general population-based health survey such as the CCHS. For instance, the 2014 SLCDC-MA collected information on the impacts of respondents' mental health (e.g. disorder-attributable limitations in usual and work-related activities) and the management approaches used (e.g. medications, psychological counselling and self-management strategies). Given that the 2014 SLCDC-MA only includes people who reported having been diagnosed with a mood and/or an anxiety disorder, the estimates derived reflect the characteristics of that population, not the prevalence of the conditions.

Survey objectives

The objectives of the 2014 SLCDC-MA were to (1) assess the impact of mood and/or anxiety disorders on Canadian adults' usual and work-related activities; (2) describe how people with mood and/or anxiety disorders manage their disorder; (3) identify the barriers to care and self-management strategies; and (4) identify factors that influence mental illness outcomes.

Survey content development

The content of the 2014 SLCDC-MA was developed through an iterative, consultative process between PHAC and Statistics Canada, with input from members of PHAC's Mental Health and Mental Illness Surveillance Advisory Committee (Advisory Committee).* Content selection was informed by the survey objectives, data gaps identified by PHAC and the Mental Health Commission of Canada (MHCC)[12] as well as recommendations from the Advisory Committee.

Survey questions relevant to the domains of interest were derived from a variety of sources including publicly available population-based surveys, published instruments and/or well-known scales. Certain questions were modified based on consultations with experts and some were informed by existing national clinical practice guidelines. Questions were grouped into modules based on theme or subject matter. A description of each module, the source of the questions or instruments included, and other relevant information is summarized in Table 1.

Questions were reviewed to ensure age- and population-appropriateness, suitability for telephone administration, and relevance to the 2014 SLCDC-MA objectives. Using the 2013 CCHS questionnaire as a guide, questions were organized by theme, and reformatted focussing on sequencing and skip patterns, standardization of scales and points of view and consistent use of language. Response bias and respondent fatigue were considered when removing leading questions and potential redundancy.

Respondent burden and the time constraints of a telephone interview dictated, for the most part, the length of the survey. Content included in the questionnaire for qualitative testing was determined based on ease of analysis and interpretation, and on the potential for translating the resulting information into actionable public health messages.

* Members include university-affiliated researchers, government and/or government ministries, and non-governmental organizations (NGOs) that represent the interest of individuals affected by the disorders of interest, such as the Mood Disorders Society of Canada.

TABLE 1
Modules of the 2014 SLCDC-MA questionnaire

Module	Content focus	No. of questions[a]	Brief description	Source
1. Survey introduction	Administrative	n/a	Provides the respondent with the necessary background and purpose of the survey.	n/a
2. General health	General	4	Asks respondents about their general health, life satisfaction, mental health and life stress.	Questions from the *General health* module of the 2013 CCHS–Annual Component[23] were repeated since they serve as a good warm-up, are sensitive to change and important in the assessment of the health status of those with mood and anxiety disorders.
3. Confirmation of diagnosis	Mood or anxiety disorder–specific	7 (11)[b]	Confirms that the respondent belongs to the target population, and asks about the type of mood and/or anxiety disorder, the age at diagnosis and the age at first symptoms.	Modified screening questions from the *Chronic conditions* module of the 2013 CCHS–Annual Component[23] to inquire if the respondent has, or ever has been diagnosed with a mood and/or an anxiety disorder. All other questions were adopted from a previous disease/condition-specific cycle of the SLCDC[24] to capture the topics of interest in relation to mood and anxiety disorders.
4. Medication use	Mood or anxiety disorder–specific	11	Focusses on the respondent's use of prescription medications, to help manage their mood and/or anxiety disorder, reasons for no longer taking/having never taken, adherence patterns, and the use of natural health products.	Modified questions from previous disease/condition-specific cycles of the SLCDC[24,27] to capture the topics of interest in relation to mood and anxiety disorders.
5. Self-management	Mood or anxiety disorder–specific	9 (22)[c]	Asks respondents about things they may have done as a result of being diagnosed to help manage their mood and/or anxiety disorder, the status of their engagement at the time of survey, and reasons for not doing so. Questions are similar to those in the *Clinical recommendations* module in an effort to determine whether respondents are following the recommended best practices.	Modified questions from previous disease/condition-specific cycles of the SLCDC[24,27] which were informed by clinical guidelines/best practices related to self-management of mood and anxiety disorders.[28,29]
6. Contact with health professionals	Mood or anxiety disorder–specific	5	Asks respondents about interactions with health professionals regarding their mood and/or anxiety disorder in the past 12 months. Some questions specifically ask about psychological counselling.	Modified questions from the 2013 CCHS–Annual Component[23] to capture the topics of interest in relation to mood and anxiety disorders.
7. Clinical recommendations	Mood or anxiety disorder–specific	7	Documents specific recommendations suggested by a doctor or other health professional that may help respondents manage their mood and/or anxiety disorder.	Modified questions from previous disease/condition-specific cycles of the SLCDC[24,27] and informed by clinical practice guidelines/best practices related to the management of mood and anxiety disorders.[28,29]
8. Restriction of activities	Mood or anxiety disorder–specific	8	Asks respondents about being limited in usual activities in the past 12 months because of their mood and/or anxiety disorder.	Modified questions from the *Health status (SF-36)* module in the 2013 CCHS–Annual Component[23] to capture the topics of interest in relation to mood and anxiety disorders.
9. Restriction of work-related activities	Mood or anxiety disorder–specific	7	Asks respondents about current and past employment status, and changes made to work-related activities due to their mood and/or anxiety disorder.	Modified questions from US National Health Interview Survey (NHIS).[30]
10. Sleep	Mood or anxiety disorder–specific	3	Asks respondents about the number of sleep hours, whether they have difficulty going to sleep or staying asleep and reasons why they may have trouble going to sleep or staying asleep.	Questions from the *Sleep* module in the 2013 CCHS–Annual Component[23] were repeated since they are sensitive to change. In addition, a question asking why respondents may have trouble sleeping was added.
11. Stress	Mood or anxiety disorder–specific	3	Asks respondents about the various stressors encountered in daily life, their ability to deal with them, and the main source of stress.	Questions from the *Stress - Sources* module in the 2013 CCHS–Annual Component[23] were repeated since they are sensitive to change. The question on sources of stress was modified to ensure that the response options were read to the respondent.

Continued on the following page

TABLE 1 (continued)
Modules of the 2014 SLCDC-MA questionnaire

Module	Content focus	No. of questions[a]	Brief description	Source
12. Social provisions scale	Mood or anxiety disorder–specific	10	Focusses on the degree to which respondents' social relationships provide various dimensions of social support.	Social Provisions Scale (24 items) developed by Cutrona and Russell (1987),[31] and validated in French by Caron (1996, 2013).[32,33]
13. Administration	Administrative	4	This module informs respondents about the linking of their information from the 2014 SLCDC-MA to their responses from the 2013 CCHS–Annual Component. Respondents are then asked if this information can be shared with Statistics Canada's share partners.	2013 CCHS–Annual Component.[23]

Abbreviations: CCHS, Canadian Community Health Survey; n/a, not applicable; SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Component.

[a] The number of questions delivered to each respondent depends on skip patterns and the eligibility of the respondent for particular questions.

[b] Although 7 questions make up this module, 2 are split into parts, resulting in a total of 11 questions.

[c] Although 9 questions make up this module, several are split into parts, resulting in a total of 22 questions.

Questions related to specific themes were removed before qualitative testing if they: (1) were already covered on the 2013 CCHS, and therefore can be obtained through record linkage (e.g. educational attainment and nutrition); (2) were too broad to be adequately addressed within the allocated survey time (e.g. health utility index, stages of behavioural change); (3) required detailed explanations; or (4) were judged to be better measured via a longitudinal survey (e.g. recovery).

Questions were added to obtain respondents' permission to share data and link their 2014 SLCDC-MA responses to those of the 2013 CCHS. The English questionnaire was translated into French to allow for implementation in the two official languages of Canada. The French translation of the questionnaire was validated in a side-by-side review. The final questionnaires were then built into a computer-assisted telephone interview (CATI) application, which ensured consistent survey administration by interviewers.

Qualitative testing

Statistics Canada's Questionnaire Design and Review Centre (QDRC) tested both the English and the French 2014 SLCDC-MA questionnaires in face-to-face interviews with selected respondents.

Qualitative testing interviews were conducted in March 2013 in Toronto (English) and in Montreal (French). The 2012 CCHS–Annual Component was used as the frame to select respondents for the interviews. A total of 26 participants took part in the testing, representing a cross section of persons who reported having a mood and/or an anxiety disorder that had been diagnosed by a health professional in the 2012 CCHS interview. Informed by theoretical frameworks and methods based in cognitive and social psychology,[34,35] each interview explored the four steps of the cognitive process used to respond to a questionnaire: (1) understanding the question and response categories; (2) recalling and/or searching for the requested information; (3) thinking about the answer and making a judgment about what to report; and (4) reporting the answer. All interviews were conducted by a trained interviewer from the QDRC and observed from behind a one-way mirror by members of the 2014 SLCDC-MA project team (i.e. personnel from Statistics Canada and PHAC).

The QRDC produced reports on the results of the English and French qualitative testing interviews, which were then used to further refine and finalize the survey content. Overall, the survey was well received by participants. They reported that the modules within the questionnaire flowed well and the questions within the modules covered the main aspects of living with a mood and/or an anxiety disorder. However, modules that measured the concepts of resiliency and mastery were somewhat difficult for participants to answer, due to the inclusion of questions that alternated between positive and negative concepts, and to the sensitive nature of the topics covered. In light of this difficulty, the 2014 SLCDC-MA project team decided to remove these modules from the questionnaire. Furthermore, the team made modifications to some of the retained modules in an effort to improve clarity on what was to be reported and to ensure proper identification of in-scope respondents.

Final questionnaire

The final, 20-minute questionnaire comprises 12 modules, addressing each of the objectives of the 2014 SLCDC cycle. The full questionnaire is available on Statistics Canada's website at http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5160

Target population

The target population of the 2014 SLCDC-MA was Canadians aged 18 years and older as of 31 December, 2013, living in private dwellings in the 10 provinces, who responded affirmatively to at least one of the following two 2013 CCHS questions: "Remember, we're interested in

conditions diagnosed by a health professional and that are expected to last or have already lasted six months or more. Do you have a mood disorder such as depression, bipolar disorder, mania or dysthymia?" or "Do you have an anxiety disorder such as a phobia, obsessive-compulsive disorder or a panic disorder?" The study results therefore relate to Canadians who sought care for a mood or an anxiety disorder or both and received a diagnosis. Since the sample does not include Canadians who did not seek care, or who attempted to obtain care but were unsuccessful despite the presence of mood and/or anxiety disorder symptoms that meet diagnostic criteria, the applicability of the results to these individuals is uncertain.

Residents of the three territories, people living on Indian reserves or Crown lands, people living in institutions, full-time members of the Canadian Forces and residents of certain remote regions were excluded. With the exception of the three territories, the exclusions are those of the 2013 CCHS sampling frame. Overall, these exclusions represent approximately 3% of the Canadian population.

In addition, respondents with a mood and/or an anxiety disorder living in one of the 10 provinces who met any of the following criteria were excluded from the sample:

- they did not have a valid telephone number;
- they completed the CCHS interview by proxy; and/or
- they did not give permission to share their responses with Statistics Canada share partners and to link their 2014 SLCDC-MA responses to those of the 2013 CCHS.

Sampling strategy

The survey sample was developed using a two-phase design: the first phase was the 2013 CCHS sample and the second was the 2014 SLCDC-MA sample. The 2013 CCHS sample was selected from two frames: an area frame designed for the Labour Force Survey and a list frame of telephone numbers, with each frame making up half of the sample. The 2014 SLCDC-MA sampling frame consisted of 2013 CCHS respondents who met the criteria outlined in the target population section.

The 2014 SLCDC-MA sample was designed to produce reliable estimates at the national level by age group and sex. The targeted age groups were 18 to 34 years, 35 to 49 years, 50 to 64 years and 65 years and older (Table 2). As well, the sample allows for estimates at the regional level (Atlantic, Quebec, Ontario, Prairies, and British Columbia). The sample size was limited by the number of people who reported having been diagnosed with a mood and/or an anxiety disorder in the 2013 CCHS.

Data collection and processing

Statistics Canada collected data for the 2014 SLCDC-MA in two waves, each consisting of a five-week period: the first took place in November/December 2013, and the second in February/March 2014. Selected respondents were interviewed from centralized call centres using the CATI application.

Statistics Canada used several practices to minimize non-response. Introductory letters were sent to the targeted respondents explaining the purpose of the survey before the start of the collection period. Interviewers were instructed to make all reasonable attempts to obtain interviews; when a respondent was no longer available at the phone number provided on the 2013 CCHS, attempts were made to find their current number. For people who at first refused to participate, additional efforts were made, including a letter followed by a second call, in order to convince the respondent of the importance of their participation. Finally, to remove the possibility of language as a barrier, Statistics Canada was prepared to recruit interviewers with a wide range of language competencies if necessary. This was not required, however, as all interviews were conducted in either English (80%) or French (20%).[36]

Between April and September 2014, Statistics Canada processed, estimated, and documented the data. Editing, coding and the creation of derived and grouped variables were performed either at the interview stage (for editing and coding) or at the data processing stage (derived and grouped variables creation). A survey weight was given to each person on the final data file; the weight can be interpreted as the number of people in the population that are represented by the respondent. The 2014 SLCDC-MA weighting process began with the 2013 CCHS person-level share weight, because the 2014 SLCDC-MA survey frame was composed of respondents from this survey. A five-step weighting strategy was then used to adjust the sample weight for exclusions, sample selection, in-scope rates, non-response and permission to share and link.

Given the complex sampling design of the 2014 SLCDC-MA, the variance cannot be

TABLE 2
2014 SLCDC-MA initial sample size, modelled in-scope cases, and response rate by sex and age group

Sex	Age group (years)	Selected sample size	Modelled number of in-scope cases	Modelled in-scope rate	Number of respondents	Response rate
Females	18–34	875	720	82.3%	436	60.6%
	35–49	741	672	90.7%	453	67.4%
	50–64	1361	1211	89.0%	892	73.7%
	65+	990	765	77.3%	559	73.1%
Total		3967	3368	84.9%	2340	60.5%
Males	18–34	399	306	76.6%	175	57.3%
	35–49	425	350	82.4%	226	64.5%
	50–64	659	554	84.1%	391	70.6%
	65+	425	302	71.2%	229	75.7%
Total		1908	1513	79.3%	1021	67.5%
Overall		5875	4881	83.1%	3361	68.9%

Abbreviation: SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component.

calculated using simple formulas and requires a resampling method. The bootstrap is an inference technique based on successive resampling. The survey bootstrap exploits the existing sample to build synthetic samples called "replicates." These replicates are used to estimate the variance of a parameter. Statistics Canada developed coordinated bootstrap weights for the 2014 SLCDC-MA because of its dependence on the 2013 CCHS sample. Hence, the starting point for the 2014 SLCDC-MA bootstrap weights was the 500 replicates from the 2013 CCHS share bootstrap file. Each bootstrap replicate was adjusted using the five adjustments steps listed previously. More information about the weighting process can be found in the 2013 CCHS User Guide.[22]

For respondents who agreed to share and link their responses, the 2014 SLCDC-MA data were linked to the 2013 CCHS.

Data confidentiality and availability

To preserve respondent confidentiality, all personal identifiers were removed from the share-linked file. Data were ready for use in October 2014 and were made available to PHAC, Health Canada and provincial health ministries. Researchers and third parties can access the 2014 SLCDC-MA data through university-based Research Data Centres run by Statistics Canada.

Ethics

Statistics Canada determined that ethics approval to administer the 2014 SLCDC-MA was not required as no physical measures were collected. No privacy or confidentiality risks, as governed by the Privacy Impact Assessment policy, were identified, and the Chief Statistician allowed the survey to proceed.

Respondents' participation in the 2014 SLCDC-MA was completely voluntary and proxy interviews were not permitted. Statistics Canada is prohibited by law from releasing any information it collects that could identify any person, business or organization, unless consent has been given by the respondent as per the *Statistics Act*.[1] Statistics Canada's share partners for the CCHS (i.e. PHAC, Heath Canada and provincial and territorial health departments) have access to the data under the terms of their respective data-sharing agreements. These data files contain information only on respondents who agreed to share their data with Statistics Canada's share partners and to link their responses from the 2014 SLCDC-MA to their responses from the 2013 CCHS. Personal identifiers were removed from the share files to respect respondent confidentiality. Users of these files must first certify that they will not at any time disclose information that might identify a survey respondent.

Data quality

Out-of-scope cases

Out-of-scope cases correspond to respondents approached to complete the survey but who should not be included because they do not meet the eligibility criteria for the survey.

The respondents of the 2014 SLCDC-MA were classified into two groups: resolved and unresolved cases. The unresolved case group consists of those respondents that could not be contacted during data collection, resulting in uncertainty about whether they belonged to the out-of-scope or in-scope category. The resolved case group consists of respondents that were selected in the sample and with whom Statistics Canada established contact and thus could determine whether they were out-of-scope or in-scope for the survey. Out-of-scope respondents included, for example, those who identified themselves as having a mood and/or an anxiety disorder in the 2013 CCHS but said they *never* had either disorder during the 2014 SLCDC-MA interview.

In order to minimize the number of out-of-scope cases in the 2014 SLCDC-MA, two questions were included for follow-up with those respondents who reported that they do not currently have a mood or an anxiety disorder diagnosed by a health professional. These questions were aimed at identifying respondents who *had ever been diagnosed* with either type of disorder, but were no longer experiencing symptoms or who were able to manage their condition through medication or changes to their lifestyle. As a result, these respondents were included in the survey, which resulted in an overall reduction in the number of out-of-scope cases.

However, due to the number of out-of-scope cases, the total number of people who reported a mood and/or an anxiety disorder differs between the 2013 CCHS and the 2014 SLCDC-MA. The 2013 CCHS likely includes some respondents who reported having a mood and/or an anxiety disorder but do not (false positives). Conversely, the 2014 SLCDC-MA likely excluded some respondents who really do have the condition but who indicated otherwise to avoid completing the survey (false negatives). The extensive verifications performed through the Confirmation of Diagnosis module may have potentially contributed to increasing the validity of the 2014 SLCDC-MA diagnosis data, although this has not been empirically studied.

Survey errors

Generally, survey errors can be divided into sampling errors and non-sampling errors. Sampling errors occur because inferences about the entire population are based on information obtained from only a sample of that population, while non-sampling errors occur as a result of various systematic and random errors not attributed to sampling.[22]

Sampling errors

All 2013 CCHS respondents who reported a mood and/or an anxiety disorder were selected for the 2014 SLCDC-MA, after excluding respondents for operational reasons. However, because the 2013 CCHS is a sample survey, the 2014 SLCDC-MA is not a census of people with mood and/or anxiety disorders. It is an accepted fact that somewhat different estimates would be obtained if a census had been performed using the same questionnaire, interviewers, processing methods, etc.

Non-sampling errors

Non-sampling errors may occur at almost every step of a survey operation and can arise from problems in coverage, non-response, response and processing errors.[23] Non-sampling errors cannot be quantified or mitigated by increasing the sample size.

Coverage errors occur when cases are omitted (under-coverage), duplicated or wrongfully included (over-coverage). The

[1] An Act respecting statistics of Canada. Available from: http://laws-lois.justice.gc.ca/eng/acts/S-19

2014 SLCDC-MA has the same coverage as the 2013 CCHS in the 10 provinces. Given the high coverage rate of the CCHS, it is unlikely that any significant bias was introduced into the 2014 SLCDC-MA data.

Non-response errors are the result of insufficient answers to the survey questions and can vary from partial non-response (i.e. failure to answer just one or several questions) to complete non-response. In the 2014 SLCDC-MA, people who partially responded to one or more questions were removed from the survey; however, as respondents tend to complete the questionnaire once they start the interview, partial non-response is rare. Complete non-response occurs because the interviewer is either unable to contact the respondent, or the respondent refuses to participate in the survey. In an effort to reduce the risk of being unable to follow up with selected respondents during the time period between the administration of the 2013 CCHS and the 2014 SLCDC-MA, the data collection was divided into two waves. Those who participated in the first six months of the 2013 CCHS data collection period were contacted as part of the first wave (November/December, 2013), while those in the latter six months of the 2013 CCHS data collection period comprised the second wave (February/March, 2014). The use of two waves ensured that the lag time between the 2013 CCHS and 2014 SLCDC-MA was no greater than 14 months. Complete non-response was addressed by adjusting the weight of individuals who responded to the survey to compensate for those who did not respond and to minimize any bias arising from non-response.

Response error may arise as a result of interviewers misunderstanding instructions, respondents making errors in answering questions or answers being incorrectly entered on the questionnaire. Statistics Canada implemented quality assurance measures in order to minimize these types of errors. These measures included the use of highly skilled interviewers, extensive training of interviewers with respect to the survey procedures and questionnaire, observation of interviews to ensure proper techniques and procedures were followed as well as to detect problems of questionnaire design or misunderstanding of instructions, and the use of procedures to ensure that data-capture errors were minimized. Finally, processing and tabulation errors were minimized by performing coding and quality checks to verify the processing logic.

Data analysis

We used descriptive analyses to characterize the survey respondents' sociodemographic characteristics. The analyses were carried out using SAS Enterprise Guide version 5.1 (SAS Institute, Cary, NC, USA). To account for sample allocation and survey design, all estimates were weighted using survey weights generated by Statistics Canada in order to reflect the age and sex distribution of the household population aged 18 or older in the 10 provinces. Furthermore, variance estimates (95% confidence intervals and coefficients of variation) were generated using the bootstrap weights provided with the data.[37]

The sociodemographic characteristics included in this analysis are

- sex (female; male);
- age (18–34; 35–49; 50–64; 65+ years);
- marital status (single; married or living common-law; widowed, separated, divorced);
- educational attainment (less than secondary school graduation; secondary school graduation, no post-secondary; some post-secondary education; post-secondary graduation);
- household income adequacy quintiles;
- immigrant status (yes; no);
- length of time in Canada since immigration (≤ 20 years; > 20 years);
- Aboriginal status (yes; no);
- place of residence (urban; rural);
- geographical region (Atlantic; Quebec; Ontario; Prairies; British Columbia); and
- self-reported type of disorder diagnosed by a health professional (mood disorder only; anxiety disorder only; both mood and anxiety disorder).

Income was measured using the adjusted household income adequacy quintiles. Respondents were divided into quintiles based on the ratio of their total household income to the low income cut-off corresponding to their household and community size, as derived by Statistics Canada. This measure provides, for each respondent, a relative measure of their household income to the household incomes of all other respondents.[22] For respondents with missing income information, Statistics Canada uses nearest-neighbour donor imputation, which models income based on family structure, sociodemographics, some health variables, and income derived from aggregate tax information. Income was imputed for 23% of the 2014 SLCDC-MA respondents who did not provide a best estimate to the total household income question (14.7% who fully reported income range; 4.1% who partially reported income range; and 4.7% who provided no income information).

Results

Final 2014 SLCDC-MA sample

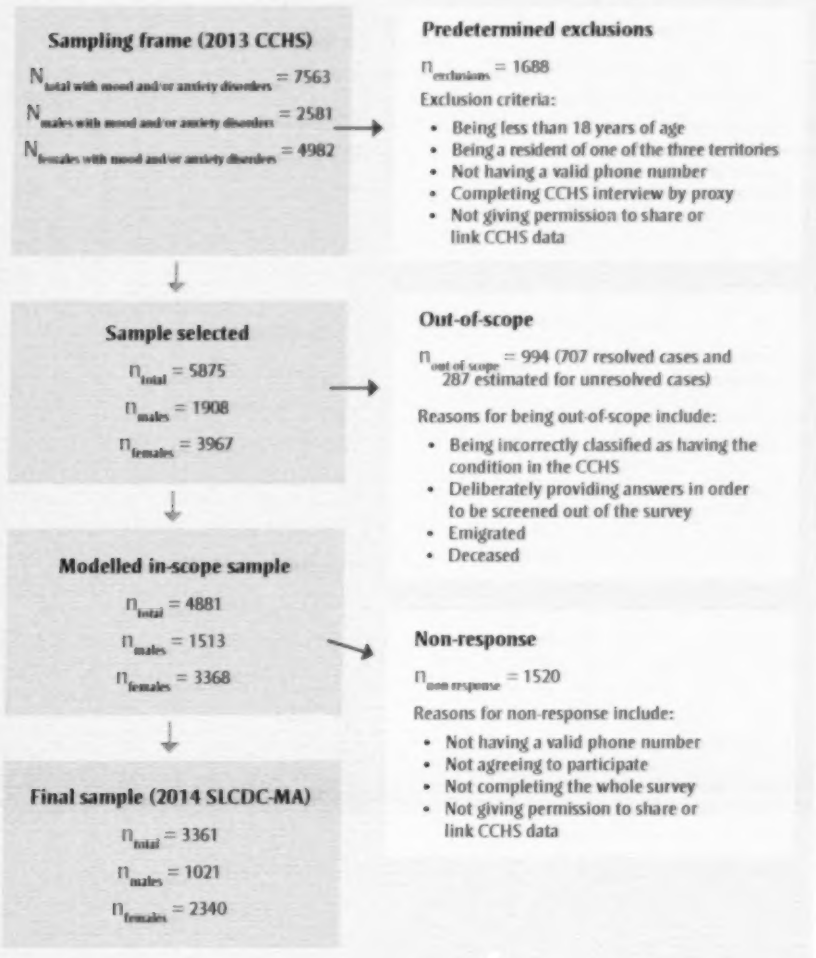
The sample design of the 2014 SLCDC-MA is shown in Figure 1, and the initial sample size, modelled in-scope cases and response rate by sex and age group are summarized in Table 2. A total of 7563 respondents who reported being diagnosed with a mood and/or an anxiety disorder by a health professional were captured in the sampling frame (2013 CCHS). Upon applying the predetermined exclusion criteria for the 2014 SLCDC-MA, 1688 respondents were excluded.

Of the 5875 respondents selected for the 2014 SLCDC-MA, 707 were found to be out-of-scope (resolved cases) which resulted in an out-of-scope rate of 17.0%. An additional 287 were estimated to be out-of-scope based on predictions of logistic modelling (unresolved cases).

After excluding the out-of-scope respondents (resolved and unresolved), there were 4881 respondents within the modelled in-scope sample (i.e. respondents eligible for the 2014 SLCDC-MA interview), resulting in a modelled in-scope rate of 83.1%.

Lastly, an additional 1520 respondents were excluded due to non-response (complete and partial), leaving a final sample of 3361 available for analysis. The overall response rate for the 2014 SLCDC-MA was therefore 68.9%. The response rate was at its lowest among men (57.3%) and women (60.6%) from 18 to 34 years of age.

FIGURE 1
2014 SLCDC-MA sample design


Sampling frame (2013 CCHS)
$N_{total\ with\ mood\ and/or\ anxiety\ disorders}$ = 7563
$N_{males\ with\ mood\ and/or\ anxiety\ disorders}$ = 2581
$N_{females\ with\ mood\ and/or\ anxiety\ disorders}$ = 4982
Predetermined exclusions
$n_{exclusions}$ = 1688
Exclusion criteria:
• Being less than 18 years of age
• Being a resident of one of the three territories
• Not having a valid phone number
• Completing CCHS interview by proxy
• Not giving permission to share or link CCHS data
Sample selected
n_{total} = 5875
n_{males} = 1908
$n_{females}$ = 3967
Out-of-scope
$n_{out\ of\ scope}$ = 994 (707 resolved cases and 287 estimated for unresolved cases)
Reasons for being out-of-scope include:
• Being incorrectly classified as having the condition in the CCHS
• Deliberately providing answers in order to be screened out of the survey
• Emigrated
• Deceased
Modelled in-scope sample
n_{total} = 4881
n_{males} = 1513
$n_{females}$ = 3368
Non-response
$n_{non\ response}$ = 1520
Reasons for non-response include:
• Not having a valid phone number
• Not agreeing to participate
• Not completing the whole survey
• Not giving permission to share or link CCHS data
Final sample (2014 SLCDC-MA)
n_{total} = 3361
n_{males} = 1021
$n_{females}$ = 2340

Abbreviations: CCHS, Canadian Community Health Survey; N, total population size; n, subsample size; SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component.

Sociodemographic characteristics of Canadians aged 18 years and older with mood and/or anxiety disorders

The sociodemographic characteristics of the population with mood and/or anxiety disorders are presented in Tables 3 and 4 and Figure 2. Almost two-thirds (64%) were female. While the highest proportion was aged 50 to 64 years, the proportion of young (18–34 years) and middle aged (35–64 years) were fairly evenly distributed. Seniors (65+ years) represented only 15% of the population. More than half (56%) were married or in a common-law relationship, approximately a quarter were single and the remaining 18% reported being separated, divorced or widowed. Close to two-thirds (60%) reported having obtained a university degree, post-secondary certificate or diploma. Household income was fairly evenly distributed between the adequacy quintiles; however, individuals were more likely to report a household income within the lowest (23%) versus highest (17%) adequacy quintile. The majority (88%) were Canadian-born, and two-thirds (67%) of the immigrants had been living in Canada for more than 20 years. Most (95%) were of non-Aboriginal status and the majority (82%) resided in an urban setting. The geographical distribution of the population was as follows: 40% resided in Ontario, 20% in Quebec, 17% in the Prairies, 14% in British Columbia and 9% in the Atlantic Provinces. Finally, 45% reported being diagnosed by a health professional with a mood disorder only, 24% with an anxiety disorder only, and 31% reported having been diagnosed with both.

Discussion

The 2014 SLCDC-MA is the only population-based household survey to date that provides data on the experiences of Canadian adults with a professionally diagnosed mood and/or anxiety disorder. Topics covered by the survey include usual and work-related activities, stress, sleep, social relationships, clinical management strategies such as health professional contacts and recommendations, medication use, counselling and self-management practices. This survey addresses important data gaps identified by PHAC, the MHCC[12] and other external stakeholder organizations.

Our findings with respect to the distribution of the sociodemographic characteristics among Canadian adults with mood and/or anxiety disorders generally agree with those from other studies. With respect to sex, mood and anxiety disorders have consistently been shown to be more common among females than males.[38,39] Many factors may explain this, including behavioural (women have been shown to have more positive help-seeking attitudes than men),[40] biological (hormonal fluctuations related to various aspects of reproductive function are thought to predispose women to depression),[41] and sociocultural (women report experiencing stress related to work and family responsibilities more frequently than men).[42]

Studies carried out on populations with mood or anxiety disorders using a similar age range (18 years and older) have also shown that the age distribution of these disorders peaks in middle-age and declines in older age.[38,39,43] The higher proportion of respondents in the middle-aged group may relate, in part, to the unique challenges that these individuals often face, such as stress associated with an imbalance between work and personal or family life.[44,45]

TABLE 3
Sociodemographic characteristics of Canadians aged 18 years and older with mood and/or anxiety disorders, 2014 SLCDC-MA

Sociodemographic characteristics	2014 SLCDC-MA (n = 3361)	
	n[a]	%[b] (95% CI)
Sex		
Male	1020	36.3 (34.2–38.4)
Female	2341	63.7 (61.6–65.8)
Age (years)		
18–34	610	26.0 (24.0–28.1)
35–49	682	27.9 (25.6–30.3)
50–64	1284	31.0 (28.9–33.2)
65+	785	15.0 (13.8–16.2)
Marital status		
Single/never married	823	26.3 (23.8–28.7)
Separated/divorced/widowed	926	17.7 (15.6–19.8)
Married/common-law	1610	56.1 (53.2–58.9)
Educational attainment		
Less than secondary school graduation	528	12.7 (10.9–14.4)
Secondary school graduation	728	21.5 (19.1–23.9)
Some post-secondary education	176	5.6 (4.3–6.8)
Post-secondary certificate, diploma or university degree	1895	60.3 (57.3–63.2)
Household income adequacy quintiles		
Q1 (lowest quintile)	903	23.0 (20.6–25.3)
Q2	672	18.2 (16.0–20.4)
Q3	675	22.2 (19.7–24.7)
Q4	614	19.3 (17.0–21.6)
Q5 (highest quintile)	497	17.3 (15.0–19.7)
Immigrant status		
Yes	283	12.5 (9.9–15.1)
No	3074	87.5 (84.9–90.1)
Time in Canada since immigration		
Less than or equal to 20 years	61	33.5 (22.7–44.3)
More than 20 years	222	66.5 (55.7–77.3)
Aboriginal status		
Yes	201	5.1 (3.8–6.4)
No	2913	94.9 (93.6–96.2)
Place of residence		
Rural	873	17.7 (15.8–19.6)
Urban	2488	82.3 (80.4–84.2)
Geographical region		
Atlantic	508	8.9 (8.2–9.7)
Quebec	593	20.3 (18.6–22.1)
Ontario	1162	39.8 (37.7–42.0)
Prairies	690	17.2 (15.6–18.8)
British Columbia	408	13.7 (12.0–15.4)

Continued on the following page

Marital status is a key determinant of health and it is widely acknowledged that married individuals report better health outcomes and a lower risk for mortality than those who are not married, particularly men.[46] Just over half of those in our study were married or in a common-law relationship, which is slightly higher than those found in other Canadians studies.[38,39] It is worth noting that these other studies further demonstrate that those with mood and anxiety disorders were less likely to be married or in a common-law relationship than those unaffected by these disorders.

Education is another important determinant of health and can have a significant influence on income level as well as economic well-being.[47] The proportion of those with post-secondary education in our study was similar to the findings from other Canadian studies.[38,39,48] All aforementioned studies found people with mood and anxiety disorders completed post-secondary education in the same proportion as those without these disorders.[38,39] However, when broken down by type of post-secondary education attained, people with these disorders were less likely to have a post-secondary education at the Bachelor level or above than those who were not affected.[48] With respect to income, while those in our study were more likely to report household income adequacy in the lowest quintile than in the highest, their household income adequacy was generally more evenly distributed between the quintiles compared to other studies.[38,39,48] Consequently, results based on data from the 2014 SLCDC-MA regarding health status, disorder-attributable impacts on usual and work-related activities and the management strategies adopted may reflect the best-case scenario, given the wealth of evidence that those of lower socioeconomic status are less healthy and less likely to adopt positive health behaviours.[49]

A slightly higher proportion of those in our study were of immigrant status than those found in other Canadian studies.[38,39] These studies further demonstrated that those affected by mood and anxiety disorders were less likely to be immigrants than those unaffected,[38,39] which may, in part, be explained by the "healthy immigrant effect," whereby foreign-born status presents a health advantage.[50] Knowing

TABLE 3 (continued)
Sociodemographic characteristics of Canadians aged 18 years and older with mood and/or anxiety disorders, 2014 SLCDC-MA

Sociodemographic characteristics	2014 SLCDC-MA (n = 3361)	
Type of disorder		
Mood disorder only	1531	45.2 (42.2–48.2)
Anxiety disorder only	770	24.0 (21.5–26.6)
Mood and anxiety disorder	1060	30.7 (28.0–33.4)

Abbreviations: CI, confidence interval; Q, quintile; SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component.

[a] Numbers are unweighted.

[b] Percentages are based on weighted numbers to reflect the Canadian population aged 18 years and older with mood and/or anxiety disorders living in the 10 provinces.

that this health advantage lessens with the length of time lived in Canada,[50] it is important to note that a large proportion (66.5%) of those who reported being an immigrant in our study had lived in Canada for more than 20 years.

The proportion of those living in a rural area and the proportion who reported to be of Aboriginal descent in our study were comparable to other Canadian studies.[38,39] Neither these studies nor ours demonstrated a difference between those with and those without mood and anxiety disorders in terms of the proportion living in a rural area or having Aboriginal status.[38,39] Given that Aboriginal peoples are known to be at greater risk for mental illness,[51,52] and that those living in the territories and persons living on reserves or Crown lands were not included in these studies nor ours, these findings could be a reflection of the underrepresentation of Aboriginal peoples in the population sampled.

Finally, a third of those in our study reported having been diagnosed with both mood and anxiety disorders. Epidemiological studies from Europe and the United States have shown consistently high comorbidity rates for current and lifetime depressive and anxiety disorders, ranging from 44% to 81%.[6-9] Differences in the sampling frame and/or diagnostic criteria used may account for differences in study results. Furthermore, it has been shown that individuals with co-occurring mental health issues tend to demonstrate significantly greater impacts on health and use of mental health services.[38,53,54] Since differences between those with comorbid disorders and those with one disorder only may emerge in terms of respondents' health status, disorder-attributable impacts on usual and work-related activities and management or self-management practices, consideration should be given to stratifying the survey data by disorder type.

Strengths and limitations

The 2014 SLCDC-MA provides detailed information on a wide variety of topics related to the experiences of Canadians living with mood and/or anxiety disorders, which is not feasible in a general population-based health survey. Furthermore, responses are linked to those from the source survey (the 2013 CCHS), creating an even richer dataset because the CCHS collects additional health-related information on topics such as comorbidities, lifestyle behaviours and health determinants. Associations between different factors can be explored; however, causal inferences cannot be drawn from the results due to the survey's cross-sectional design.[55]

While the 2014 SLCDC-MA was developed to be nationally representative, the generalizability of the data to the entire Canadian population may be restricted due to the exclusion of the territories and some populations known to be at risk for mental illness, such as Aboriginal peoples[51,52] living on reserves or Crown lands, the homeless,[56] institutionalized patients,[57] and prison residents.[58] The study sample is also limited to Canadians who sought care and received a mood and/or an anxiety disorder diagnosis. Hence, the generalizability of the results to those who do not seek care but meet diagnostic criteria for a

TABLE 4
Type of disorder by sex and age among Canadians aged 18 years and older with mood and/or anxiety disorders, 2014 SLCDC-MA

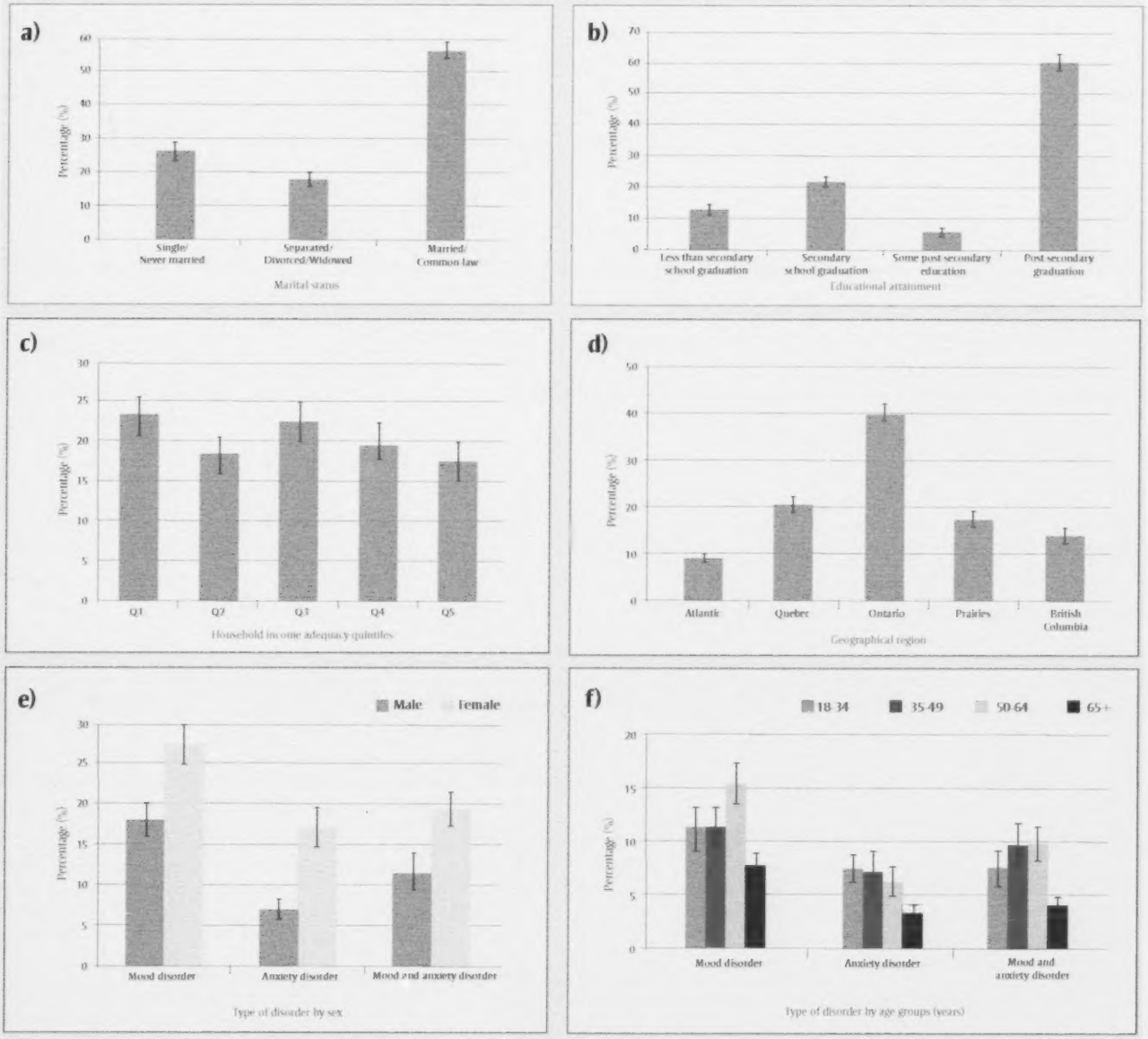
Type of disorder	Overall	Sex		Age groups (years)			
	n[a]	n[a]		n[a]			
	%[b] (95% CI)	%[b] (95% CI)		%[b] (95% CI)			
		Males	Females	18–34	35–49	50–64	65+
Mood disorder only	1531 45.2 (42.2–48.2)	510 17.9 (15.8–20.1)	1021 27.3 (24.9–29.7)	250 11.2 (9.2–13.1)	294 11.2 (9.4–13.0)	595 15.2 (13.3–17.1)	392 7.7 (6.6–8.8)
Anxiety disorder only	770 24.0 (21.5–26.6)	219 6.9 (5.7–8.2)	551 17.1 (14.7–19.5)	168 7.4 (6.0–8.9)	166 7.1 (5.2–9.0)	249 6.2 (4.9–7.5)	187 3.3 (2.7–4.0)
Mood and anxiety disorder	1060 30.7 (28.0–33.4)	291 11.4 (9.3–13.5)	769 19.3 (17.2–21.4)	192 7.5 (5.9–9.1)	222 9.6 (7.8–11.5)	440 9.7 (8.1–11.2)	206 4.0 (3.3–4.7)

Abbreviations: CI, confidence interval; SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component

[a] Numbers are unweighted.

[b] Percentages are based on weighted numbers to reflect the Canadian population aged 18 years and older with mood and/or anxiety disorders living in the 10 provinces.

FIGURE 2
Distribution of Canadians aged 18 years and older with mood and/or anxiety disorders by (a) marital status, (b) educational attainment, (c) household income adequacy quintiles, (d) geographical region, (e) type of disorder by sex and (f) type of disorder by age groups, 2014 SLCDC-MA



Abbreviation: SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component.

Note: Percentages are based on weighted numbers to reflect the Canadian population aged 18 years and older with mood and/or anxiety disorders living in the 10 provinces; error bars represent 95% confidence intervals.

mood and/or an anxiety disorder is uncertain.

As with most population-based health surveys, the 2014 SLCDC-MA relies on self-reporting of mental disorders and health-related practices or events with no third-party corroboration or verification of these self-reports. While it is the most practical method of assessing disease status and its impact in large population studies, self-reporting of health events is susceptible to misclassification due to social desirability bias, recall bias and conscious non-reporting, resulting in potential under- or overestimation of disease burden, both individual and societal. Research has found acceptable to good

agreement between self-reported physical health conditions and diagnoses made by medical professionals,[59] but validation of the questions used in the CCHS to ascertain self-reported mood and anxiety disorders has not yet, to our knowledge, been examined.

During the data collection period of the 2013 CCHS, the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V)*[60] was released. However, given that data collection was well underway during the transition from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition-Text Revision (DSM-IV-TR)*[61] to the *DSM-V*, the mood and anxiety disorders as defined within the *DSM-IV-TR* are reflected in the case finding questions in the 2013 CCHS.

Analytical limitations due to available sample size should be anticipated when disaggregating data by age, sex (especially males), geography or other characteristics of interest. For example, it was not possible to provide a statistical description of the population by ethnic group, as the estimates for the different categories had high coefficients of variation (CV), indicating high sampling variability and estimates of unacceptable quality. Consideration was given to collapsing Black, Arab and Asian ethnic groups into a "non-White" category; however, this resulted in a very diverse group, a persistently high sampling variability (CV = 22%) and a potentially limited or non-meaningful interpretation of the results.

Finally, the 2014 SLCDC-MA response rate (68.9%) was lower relative to previous SLCDC cycles (75% to 83.2%).[62,63] There is a well-documented general decline in response rates for surveys both in Canada and around the world, and the 2014 SLCDC-MA's response rate follows the same pattern as other general and health-related surveys.[64] Since non-responders did not agree to share their information with Statistics Canada's share partners, which includes PHAC, their sociodemographic characteristics and the reasons for not participating in the survey are unknown.

Conclusion

Mood and anxiety disorders are the most common mental disorders in Canada and have a major impact on the daily lives of those affected by them.[1] At present, the 2014 SLCDC-MA, a cross-sectional follow-up survey to the 2013 CCHS, is the only Canadian population-based household survey reporting information on the impact of these disorders on usual and work-related activities, and the strategies used to manage them. The survey data can offer insights to public health practitioners and clinicians about areas where additional support or intervention may be needed, and can provide baseline information for future public health research in the field of mental illness.

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Conflict of interest

The authors declare no conflict of interest.

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Health status, activity limitations, work-related restrictions and level of disability among Canadians with mood and/or anxiety disorders

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Abstract

Introduction: This study provides the first overview of the perceived general and mental health, activity limitations, work-related restrictions and level of disability, as well as factors associated with disability severity, among Canadian adults with mood and/or anxiety disorders, using a population-based household sample.

Methods: We used data from the 2014 Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component. The sample consists of Canadians aged 18 years and older with self-reported mood and/or anxiety disorders from the 10 provinces (n = 3361; response rate 68.9%). We conducted descriptive and multinomial multivariate logistic regression analyses.

Results: Among Canadian adults with mood and/or anxiety disorders, over one-quarter reported "fair/poor" general (25.3%) and mental (26.1%) health; more than one-third (36.4%) reported one or more activity limitations; half (50.3%) stated a job modification was required to continue working; and more than one-third (36.5%) had severe disability. Those with concurrent mood and anxiety disorders reported poorer outcomes: 56.4% had one or more activity limitations; 65.8% required a job modification and 49.6% were severely disabled. Upon adjusting for individual characteristics, those with mood and/or anxiety disorders who were older, who had a household income in the lowest or lower-middle adequacy quintile or who had concurrent disorders were more likely to have severe disability.

Conclusion: Findings from this study affirm that mood and/or anxiety disorders, especially concurrent disorders, are associated with negative physical and mental health outcomes. Results support the role of public health policy and programs aimed at improving the lives of people living with these disorders, in particular those with concurrent disorders.

Keywords: mood disorders, anxiety disorders, health status, activity limitations, work restrictions, disability, health utilities index, health survey, population-based survey

Highlights

- Canadian adults with mood and/or anxiety disorders were more likely to report having "fair/poor" general and mental health and more likely to have severe disability compared to the general population.
- Those with concurrent mood and anxiety disorders were more likely to report having "fair/poor" perceived general and mental health, more activity limitations and work-related restrictions and severe disability compared to those with one type of disorder.
- The majority of those with concurrent disorders required a job modification to continue working, and nearly half had to stop work altogether because of their disorders.
- Severe disability was the most prevalent disability category among those with concurrent disorders.
- Adjusting for individual characteristics, those with mood and/or anxiety disorders who were older, who had a household income in the lowest or lower-middle adequacy quintile and/or who had concurrent disorders were more likely to have severe disability.

Introduction

Mood and anxiety disorders can have a significant impact on physical and mental health, level of disability and overall quality of life.[1,2] These disorders are also associated with significant economic costs relating to the use of medical resources and to productivity losses.[3] Mood disorders include depressive and bipolar disorders, and anxiety disorders encompass a variety of conditions among which generalized anxiety disorder is the most common. In 2012, an estimated 3.5 million (12.6%) Canadians aged 15 years and older reported having symptoms consistent with a mood disorder, and 2.4 million (8.7%) reported having symptoms consistent with generalized anxiety disorder at some point during their life.[4,*] Given their high prevalence and wide-ranging impacts,

* Prevalence rates were based on a modified World Health Organization Composite International Diagnostic Interview (WHO-CIDI), which is a standardized instrument for assessment of mental disorders and conditions according to an operationalization of the definitions and criteria of the DSM-IV. Prevalence estimates based on WHO-CIDI may be incomparable to the self-reported prevalence of professionally diagnosed mood and anxiety disorders.

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mood and anxiety disorders are a major public health challenge in Canada.

Globally, unipolar depression and anxiety disorders were ranked first and sixth, respectively, as main contributors to years of life lost to disability in the 2012 Global Burden of Disease Study.[5] In Canada, approximately 4 million person-years were lost to disability overall, of which 12% were attributed to unipolar depression and bipolar disorder and about 3% to anxiety disorders. Furthermore, the Canadian Survey on Disability estimated that in 2012, 3.8 million (13.7%) Canadians aged 15 years and older had some type of disability; 1.1 million (3.9%) reported having a disability related to mental health for which depression, bipolar and anxiety disorders were the most commonly reported underlying conditions.[6]

Disability is a complex, multi-dimensional concept. The United Nations Convention on the Rights of People with Disabilities defines people with disabilities as "those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others."[7]

Many studies have used measures of activities of daily living (ADLs)[1] and instrumental activities of daily living (IADLs)[2] to define disability based on necessary functional activities that permit a person to lead an independent life.[8-10] These measures are usually derived from self-reported data collected in health surveys. The sets of activities assessed vary across surveys; therefore, it is difficult to compare results between different studies. However, studies that have used these measures have reported strong associations between depression and activity limitations.[8,9,11] An alternate measure of disability is the Health Utilities Index Mark 3 (HUI).[12,13] The disability categories based on this instrument allow for the systematic measurement and comparison of disability levels between populations.

A large body of research has shown a consistent association between depression and limitations in ADLs, IADLs and disability.[8-10,14] Furthermore, mood and anxiety disorders have been found to be associated with a loss in work productivity.[15-17] However, to our knowledge, only a few Canadian studies have examined the association between depression and activity limitations[14] and none have examined the association between mood and/or anxiety disorders, work-related restrictions and level of disability. Therefore, there is a need to obtain information regarding these relationships at a population level in Canada to inform policy and practice initiatives, facilitate the development of interventions that could diminish disability related to mood and anxiety disorders and assist in monitoring potential improvements over time.

Using data from a population-based household sample of Canadian adults living with mood and/or anxiety disorders, we had the following objectives: (1) describe the general and mental health status, activity limitations, work-related restrictions and disability; and (2) identify the sociodemographic characteristics associated with severe levels of disability.

Methods

Data source and study sample

We used data from the 2014 Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component (SLCDC-MA). The 2014 SLCDC-MA surveyed Canadians aged 18 years and older living in private dwellings in the 10 provinces identified through the 2013 Canadian Community Health Survey (CCHS) – Annual Component as having responded "yes" to having received a mood and/or anxiety disorder diagnosis from a health professional that had lasted or was expected to last 6 months or more. The final sample included 3361 respondents (68.9% response rate) with 508 from the Atlantic region, 593 from Quebec, 1162 from Ontario, 690 from the Prairie region and 408 from British Columbia. The methodology of the 2014 SLCDC-MA and the sociodemographic characteristics of the final sample have been described elsewhere.[18] The term "mood and/or anxiety disorders" used throughout this article refers to those who have self-reported, professionally diagnosed mood disorders only, anxiety disorders only or concurrent mood and anxiety disorders.

Measures

Health status was assessed using the indicators of perceived general health and mental health. Both were measured by asking respondents, "In general, would you say your health [or mental health] is excellent, very good, good, fair, or poor?"[19]

Activity limitations were measured by asking respondents how much ("a lot," "a little," or "not at all") in the past 12 months had their mood and/or anxiety disorders limited them in seven activities: recreation/leisure/hobbies; exercise/playing sports; social activities with family/friends; doing household chores; running errands or shopping; travelling/taking vacations; and bathing or dressing. These questions were based on the Health Status (SF-36) module in the 2013 CCHS–Annual Component and designed to capture activity limitations attributable to mood and/or anxiety disorders.[19]

Work-related restrictions were evaluated by asking respondents if they, in their current or past work environments, ever required a job modification including changing the number of hours ("yes" or "no"); the type of work ("yes" or "no") and/or the way in which they carried out their tasks at work ("yes" or "no"); or whether they had ever stopped working ("yes" or "no") altogether because of their mood and/or anxiety disorders. These questions were based on the U.S. National Health Interview Survey (NHIS) and designed to capture work-related restrictions attributable to mood and/or anxiety disorders.[20]

Level of disability was based on the HUI, which describes functional health based on eight domains: vision, hearing, speech, ambulation, dexterity, emotion, cognition and pain.[21] Each domain has five to six levels of functioning ranging from the lowest level to full capacity. The scores for each domain are combined into a single global utility score that ranges from 1

[1] ADLs include basic self-care tasks, e.g. "the things we normally do in our day-to-day life such as feeding ourselves, bathing, dressing, grooming, work, homemaking, and leisure" (MedTerms Medical Dictionary. [cited 2015 Aug 28]. Available from http://www.medicinenet.com/script/main/art.asp?articlekey=2131)

[2] IADLs include complex life skills required to live independently successfully and consist of domains such as housework, taking medications, managing money, shopping for groceries or clothing and using communication devices and transportation. (Bookman A, Harrington M, Pass L, Reisner E. The family caregiver handbook: finding elder care resources in Massachusetts. Cambridge, MA: Massachusetts Institute of Technology; 2007.)

(perfect health) through 0 (death) to −0.36 (a state worse than death). HUI values in the negative range reflect health states in which death might be preferable. HUI disability categories were proposed by Feeny and Furlong,[12,13] and validated by Feng et al.[22] using Canadian data. Four disability categories ("no disability," "mild disability," "moderate disability," and "severe disability") were defined based on global utilities scores. Participants were considered to have "no disability" if all domains were scored at their highest functional level (HUI = 1); "mild disability" if at least one domain was scored at a reduced level of functioning that can be corrected and does not prevent any activities ($0.89 \leq HUI \leq 0.99$); "moderate disability" if at least one domain was scored at a reduced level of functioning that cannot be corrected and prevents some activities ($0.70 \leq HUI \leq 0.88$); and "severe disability" if at least one domain was scored at a reduced level of functioning that cannot be corrected and prevents many activities ($HUI < 0.70$).

Statistical analysis

To describe respondents' health status, activity limitations, work-related restrictions and level of disability by sociodemographic characteristics, we performed a descriptive cross-tabulation analysis. We stratified data by disorder type, i.e. mood disorder only, anxiety disorder only, and concurrent disorders. The sociodemographic characteristics included sex (women, men); age groups (18–34, 35–49, 50–64 and 65 + years); marital status (single/never married, widowed/divorced/separated, married/living common-law); respondent's level of education (less than secondary school graduation, secondary school graduation, some post-secondary, post-secondary graduation); adjusted household income adequacy quintiles; Canadian regions (Atlantic region, Quebec, Ontario, Prairie region, British Columbia); area of residence (urban, rural); Aboriginal status (yes, no); and immigrant status (yes, no). We divided respondents into adjusted household income adequacy quintiles based on Statistics Canada's household income distribution in deciles, i.e. adjusted ratio of respondents' total household income to the low-income cut-off corresponding to their household and community size.[23] We used chi-square tests to determine whether there was an association between the respondents' sociodemographic characteristics and level of disability. A p-value less than .05 was considered statistically significant.

To examine the association between level of disability and respondent characteristics, we conducted a multinomial multivariate logistic regression analysis. We adjusted the model for all sociodemographic characteristics and disorder types. Results from the goodness-of-fit tests demonstrated that the model was significant and fit the data well. The likelihood ratio score and Wald tests confirmed that the model with the selected covariates was superior to the model with the intercept only. Odds ratios (ORs) with a p-value less than .05 were deemed statistically significant.

To account for sample allocation and survey design, and to generalize for the total Canadian adult population with mood and/or anxiety disorders, all estimates were weighted[§] to represent the study population and the bootstrap methodology was used for variance estimation.[24] Only results with a coefficient of variation (CV) less than 33.3% are reported as per Statistics Canada guidelines.[25] We performed all statistical analyses using SAS version 9.3 (SAS Institute Inc., Cary, NC, USA).

Results

Health status, activity limitations, work related restrictions and level of disability by disorder type

Overall, one in four Canadians aged 18 years and older with self-reported, professionally diagnosed mood and/or anxiety disorders reported "fair/poor" general and mental health (25.3% and 26.1%, respectively) (Table 1). These results varied by type of disorder. Those with concurrent disorders demonstrated poorer health outcomes: 37.9% reported "fair/poor"general health and 44.8% reported "fair/poor" mental health.

Of those with one type of disorder (i.e. either mood disorders only or anxiety disorders only), fewer than 30% reported that they had "a lot" of limitations in at least one of the seven previously described activity categories, and between 9% and 13% reported they had "a lot" of limitations in at least three of these activities. Among those with concurrent disorders (i.e. co-occurring mood and anxiety disorders), more than half (56.4%) reported limitations in at least one activity and one-third (31.2%) had limitations in at least three. Regardless of the type of disorder, "recreation, leisure or hobbies" and "social activities with family and friends" were among the top three activities for which people reported "a lot" of limitations. The third activity among the top three varied by type of disorder.

In terms of work-related restrictions, half (50.3%) of those with mood and/or anxiety disorders who ever worked or were currently working required some kind of job modification to continue working. More than one-third (34.9%) stopped working altogether because of their disorder(s). The greatest impact on work was observed among those with concurrent disorders, where two-thirds (65.8%) required a job modification to continue working and close to half (47.9%) reported that they had to stop working because of their disorders.

Overall, people with mood and/or anxiety disorders had severe disability more often than other levels of disability (36.5%). Less than one-third of those with only one type of disorder and about half (49.6%) of those with concurrent disorders had severe disability. Only one in 10 people (11.5%) with mood and/or anxiety disorders had no disability.

In summary, those with concurrent disorders were more likely to report "fair/poor" general and mental health and a greater number of activity limitations and work-related restrictions, and more likely to have severe disability compared to those with one type of disorder (Figures 1 and 2).

Sociodemographic characteristics by disorder type and level of disability[**]

Among those with mood disorders only, significant relationships were found between

[§] Sample weights adjusted by Statistics Canada for exclusions, sample selection, in-scope rates, non-response and permission to link and share.

[**] Due to small sample size, some estimates had a high CV (> 33.3%), indicating high sampling variability and estimates of unacceptable quality.

TABLE 1
Health status, activity limitations, work-related restrictions and level of disability among Canadians aged 18 years and older with mood and/or anxiety disorders, stratified by type of disorder (n = 3361), 2014 SLCDC-MA

	Type of disorder			Overall
	Mood disorders only (n = 1531) %[a] (95% CI)	Anxiety disorders only (n =) %[a] (95 CI)	Concurrent mood and anxiety disorders (n = 1060) %[a] (95% CI)	Mood and/or anxiety disorders (n = 3361) %[a] (95% CI)
Perceived general health ("fair/poor")	21.6 (18.2–25.0)	16.2 (12.4–20.0)	37.9 (32.7–43.1)	25.3 (22.9–27.7)
Perceived mental health ("fair/poor")	21.0 (17.7–24.3)	11.5 (8.5–14.5)	44.8 (39.2–50.5)	26.1 (23.4–28.8)
Number of activity limitations				
One or more	27.8 (24.2–31.5)	27.0 (21.3–32.7)	56.4 (50.8–62.1)	36.4 (33.6–39.2)
Three or more	13.2 (10.4–16.1)	9.3 (5.8–12.8)	31.2 (25.7–36.8)	17.8 (15.5–20.1)
Work-related restrictions[b]				
Required some kind of job modification to continue working	43.6 (38.4–48.8)	44.2 (36.9–51.6)	65.8 (59.7–71.9)	50.3 (46.7–54.0)
Ever stopped working altogether	32.1 (27.2–37.1)	24.3 (18.0–30.7)	47.9 (41.3–54.6)	34.9 (31.7–38.8)
Level of disability				
Severe	31.5 (27.6–35.4)	29.2 (23.8–34.6)	49.6 (44.0–55.1)	36.5 (33.6–39.4)
Moderate	24.7 (20.4–29.0)	19.4 (14.7–24.2)	22.9 (18.3–27.5)	22.9 (20.2–25.5)
Mild	30.9 (26.7–35.0)	38.9 (32.9–45.0)	18.9 (14.7–23.1)	29.1 (26.3–31.9)
None	12.9 (9.5–16.3)	12.5 (8.8–16.2)	8.6 (5.7–11.6)	11.5 (9.6–13.4)

Abbreviations: CI, confidence interval; SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component.

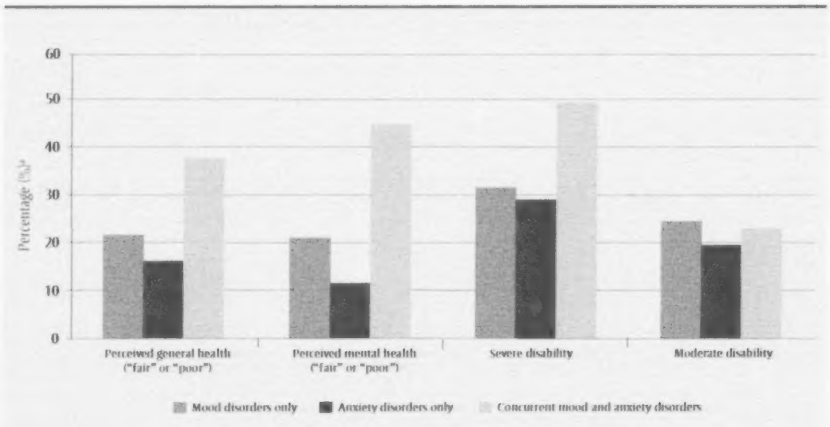
[a] Percentages are based on weighted numbers to reflect the Canadian population aged 18 years and older with mood and/or anxiety disorders living in the 10 provinces.

[b] Among those who ever worked or continue working (n = 2528).

level of disability and age, level of education, and household income adequacy (Table 2). Those aged 50 years and older were more likely to have severe disability compared to those in the youngest age group. Also, those with less than secondary school education and those in the lowest household income adequacy quintile were more likely to have severe disability compared to those with a post-secondary education and those in the two highest household income adequacy quintiles.

For those with anxiety disorders only, we found significant relationships between the level of disability and marital status, and level of disability and household income adequacy. Those who were widowed/divorced/separated were more likely to have severe disability compared to those who were single/never married or married/living common-law. In addition, those in the lowest household income adequacy quintile were more likely to

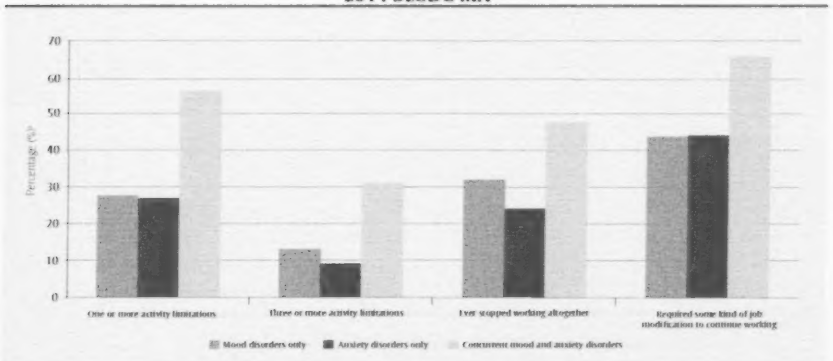
FIGURE 1
Health status and disability, by type of disorder among Canadians aged 18 and older with mood/or anxiety disorders (n = 3361), 2014 SLCDC-MA



Abbreviation: SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component.

[a] Percentages are based on weighted numbers to reflect the Canadian population aged 18 years and older with mood and/or anxiety disorders living in the 10 provinces.

FIGURE 2
Activity limitations (n = 3361) and work-related restrictions (n = 2528) by type of disorder among Canadians aged 18 years and older with mood and/or anxiety disorders, 2014 SLCDC-MA



Abbreviation: SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component.

[a] Percentages are based on weighted numbers to reflect the Canadian population aged 18 years and older with mood and/or anxiety disorders living in the 10 provinces.

have severe disability than those in the two highest household income adequacy quintiles.

Among those with concurrent disorders, we found a significant relationship between level of disability and household income adequacy only; those in the lowest household income adequacy quintile were more likely to have severe disability than those in the three highest household income adequacy quintiles.

We found no significant relationships between levels of disability and sex, geographical region or area of residence. Due to small sample sizes, a cross-tabulation analysis for immigrant and Aboriginal populations was not possible.

In summary, we observed a higher proportion of those with severe disability to be in the lowest household income adequacy quintile (mood and/or anxiety disorders); to be 50 years of age and older or have less than secondary school level of education (mood disorders only); or to be widowed, divorced or separated (anxiety disorders only).

Factors associated with varying levels of disability

Upon adjusting for all sociodemographic characteristics and types of disorder, the results from the multinomial multivariate logistic regression analysis demonstrated that those aged 50 to 64 years were 4.5 times more likely to have severe disability compared to those 18 to 34 years of age (Table 3). To a lesser extent, those aged 35 to 49 and 65 years and older were also more likely to have severe disability compared to the youngest age group (OR = 2.7 and 2.2, respectively). In addition, those in the lowest and lower-middle household income adequacy quintiles were more likely to fall into the severe disability category compared to those in the highest household income adequacy quintile (OR = 2.7 and 2.9, respectively). Lastly, those with concurrent disorders were 1.9 times more likely to be severely disabled compared to those with anxiety disorders only.

There were no significant ORs found between the individuals' level of disability and sex, marital status, level of education, immigrant status, Aboriginal status, area of residence or geographical region, with the exception of the Canadian Prairies. When compared to their counterparts living in Ontario, those with mood and/or anxiety disorders in the Prairies were 1.7 times more likely to have severe disability; however, the OR was only marginally statistically significant.

In summary, those at highest risk for severe disability were older in age, especially those between 50 and 64 years, were in the lowest and lower middle household income adequacy quintiles, and had concurrent disorders.

Discussion

The results of our study affirm that mood and anxiety disorders play a significant role in an individual's perceived general and mental health status. Compared to the general Canadian population surveyed in the 2013 CCHS–Annual Component (i.e. the source survey for the 2014 SLCDC-MA), a significantly greater proportion (2–4 times) of the population affected by mood and/or anxiety disorders reported "fair/poor" general and mental health (data not shown). Similarly, the level of disability found among those with mood and/or anxiety disorders in this study was substantially higher than that found in the general Canadian population. People with mood and/or anxiety disorders had "severe" disability more often than other levels of disability, while the general Canadian household population were more likely to have "mild" disability.[22] Furthermore, the findings from this study are consistent with results from previous research indicating that mood and anxiety disorders are associated with substantial limitations in activities[8,9,14] and disability.[10,26-28]

The causal association between mood and anxiety disorders and activity limitations and disability is complex and likely bidirectional. Chronic disease, functional limitations and disability can lead to mood fluctuations, depression[8,26] and anxiety.[29] On the other hand, longitudinal and cohort studies have demonstrated that mood disorders lead to impairments in a range of activities, even when controlling for potential confounders.[14] This relationship may be due to the core symptoms of mood disorders, which include feelings of hopelessness, loss of interest and motivation, indecisiveness, sleep disturbances and difficulty concentrating. Similarly, anxiety disorders may impair activity due to intrusive and uncontrollable worries or fears that interfere with the ability to undertake tasks and the ability to leave the house. Our study demonstrated that mood and/or anxiety disorders are positively associated with an increase in the number of activity limitations and level of disability.

Mood disorders and concurrent mood and anxiety disorders were associated with particularly high rates of moderate to severe disability. Our findings are consistent with those of previous studies that show coexisting mood and anxiety disorders increase the level of disability of those affected and have been found to increase resource consumption and health care costs to a greater degree than having

TABLE 2
Sociodemographic characteristics among Canadians aged 18 years and older with mood and/or anxiety disorders, stratified by type of disorder and level of disability (n = 3361), 2014 SLCDC-MA

	Type of disorder														
	Mood disorders only %[a] (95% CI)					Anxiety disorders only %[a] (95% CI)					Concurrent mood and anxiety disorders %[a] (95% CI)				
	Disability category					Disability category					Disability category				
	Severe	Moderate	Mild	No disability	Chi-square test *p*-value	Severe	Moderate	Mild	No disability	Chi-square test *p*-value	Severe	Moderate	Mild	No disability	Chi-square test *p*-value
Sex															
Women	33.7 (28.7–38.6)	23.5 (18.7–28.4)	30.7 (25.8–35.6)	12.1 (7.6–16.6)	.656	29.9 (23.0–36.9)	20.2 (14.5–25.9)	39.8 (32.2–47.5)	10.0 (6.2–13.8)	.239	47.8 (42.1–53.6)	24.1 (18.9–29.3)	19.9 (15.5–24.3)	8.1 (5.2–11.1)	.789
Men	28.2 (22.1–34.4)	26.4 (18.9–34.0)	31.1 (23.5–38.8)	14.2 (8.8–19.5)		27.4 (17.5–37.2)	17.4 (10.0–24.8)	36.7 (26.7–46.6)	18.6 (10.6–26.5)		52.5 (41.8–63.2)	20.8 (12.6–29.0)	17.2 (9.1–25.4)	NR[b]	
Age group (years)															
18–34	19.7 (12.5–26.9)	28.4 (19.0–37.7)	31.3 (21.1–41.5)	20.6 (11.5–29.8)	.016[c]	24.4 (13.7–35.1)	18.6 (9.0–28.2)	38.4 (27.9–48.9)	18.5 (10.3–26.7)	.404	44.8 (32.8–56.8)	28.0 (17.6–38.4)	18.6 (9.0–28.2)	8.6 (3.5–13.7)	.260
35–49	31.3 (23.3–39.3)	20.6 (12.8–28.5)	38.1 (29.5–46.7)	9.9 (5.0–14.9)		28.4 (15.8–41.0)	18.4 (8.4–28.4)	39.9 (25.2–54.6)	13.3 (5.8–20.7)		42.2 (30.3–54.2)	26.7 (15.6–37.7)	21.2 (11.9–30.5)	NR[b]	
50–64	38.1 (31.1–45.1)	25.6 (17.7–33.5)	25.6 (19.4–31.9)	10.7 (4.3–17.1)		32.6 (22.8–42.4)	19.3 (11.1–27.5)	42.9 (30.7–55.2)	5.2 (1.9–8.5)		59.6 (51.9–67.3)	14.9 (9.1–20.6)	18.8 (13.0–24.7)	6.7 (2.9–10.5)	
65+	36.0 (28.3–43.7)	23.4 (17.0–29.8)	30.0 (23.0–37.1)	10.5 (4.8–16.3)		35.2 (24.9–45.4)	23.5 (15.3–31.7)	30.4 (21.1–39.8)	10.8 (3.9–17.8)		51.8 (41.7–62.0)	23.6 (15.1–32.2)	14.1 (8.2–20.1)	10.4 (4.1–16.6)	
Marital status															
Single, never married	29.7 (21.8–37.5)	26.8 (18.1–35.4)	30.9 (21.5–40.3)	12.7 (6.1–19.2)	.171	26.3 (16.1–36.5)	24.2 (14.0–34.5)	29.8 (20.2–39.5)	19.6 (10.7–28.6)	<.001[c]	50.9 (40.8–61.1)	24.9 (15.7–34.1)	16.7 (8.2–25.2)	7.5 (3.4–11.6)	.452
Widowed/ divorced/ separated	39.6 (31.6–47.7)	29.9 (22.0–37.8)	20.1 (14.1–26.0)	10.4 (4.0–16.9)		59.0 (40.7–77.3)	15.0 (6.9–23.1)	20.9 (9.0–32.8)	NR[b]		57.5 (47.2–67.8)	14.2 (8.1–20.2)	18.6 (10.5–26.8)	9.7 (4.0–15.4)	
Married/ living common-law	29.9 (24.9–34.8)	22.2 (16.5–27.9)	34.2 (28.3–40.0)	13.8 (9.0–18.6)		23.9 (17.7–30.1)	18.1 (12.2–24.1)	47.2 (38.5–55.8)	10.8 (6.7–14.9)		45.5 (37.0–54.0)	25.5 (18.5–32.5)	20.2 (14.1–26.3)	8.8 (4.1–13.5)	
Education level															
Less than secondary school graduation	47.0 (35.0–59.0)	23.5 (14.4–32.7)	24.8 (14.5–35.1)	NR[b]	.019[c]	36.6 (25.0–48.1)	19.5 (10.8–28.2)	32.2 (20.7–43.7)	NR[b]	.281	64.2 (51.9–76.4)	17.3 (8.2–26.4)	NR[b]	NR[b]	.230

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Secondary school graduation	36.4 (28.0–44.9)	21.4 (14.3–28.5)	27.4 (20.1–34.6)	NR[b]		33.7 (21.7–45.8)	15.1 (6.4–23.7)	36.8 (25.3–48.2)	14.4 (5.3–23.6)		50.3 (39.7–60.8)	23.7 (13.9–33.5)	18.7 (10.7–26.7)	NR[b]	
Some post-secondary	29.9 (16.2–43.6)	27.8 (12.6–43.0)	19.7 (8.2–31.3)	NR[b]		NR[b]	NR[b]	NR[b]	NR[b]		63.4 (47.2–79.5)	NR[b]	NR[b]	NR[b]	
Post-secondary graduation	26.7 (22.1–31.3)	25.8 (20.0–31.6)	34.7 (28.8–40.6)	12.8 (8.8–16.8)		25.6 (18.2–33.0)	18.9 (12.8–24.9)	43.2 (34.8–51.5)	12.4 (7.7–17.0)		45.4 (37.4–53.4)	24.6 (18.2–31.0)	21.4 (15.2–27.7)	8.6 (4.6–12.6)	
Household income adequacy															
Quintile 1(lowest)	41.3 (32.9–49.6)	23.4 (15.5–31.4)	24.3 (16.1–32.5)	11.0 (4.7–17.4)	.032[c]	51.5 (37.0–66.0)	12.5 (6.4–18.6)	25.8 (14.4–37.2)	NR[b]	<.001[c]	66.7 (57.7–75.7)	15.4 (8.5–22.4)	11.4 (5.2–17.6)	6.5 (3.0–10.0)	<.001[c]
Quintile 2 (lower-middle)	38.3 (28.0–48.6)	28.7 (17.6–39.7)	21.7 (14.6–28.7)	11.4 (0.8–21.9)		20.4 (10.9–29.8)	32.2 (18.4–46.0)	38.2 (26.2–50.1)	NR[b]		52.1 (40.6–63.6)	16.5 (8.8–24.2)	18.0 (10.2–25.7)	NR[b]	
Quintile 3 (middle)	31.0 (22.3–39.7)	22.7 (12.4–33.0)	27.0 (16.9–37.2)	19.2 (10.2–28.3)		39.4 (25.8–53.0)	21.0 (9.8–32.2)	29.4 (16.2–42.7)	NR[b]		31.0 (21.2–40.9)	42.9 (30.9–54.9)	21.0 (11.9–30.0)	5.1 (2.0–8.2)	
Quintile 4 (upper-middle)	22.9 (15.5–30.4)	24.7 (17.6–31.8)	42.2 (33.2–51.3)	10.2 (4.3–16.0)		14.9 (6.8–23.0)	11.7 (5.7–17.7)	59.8 (45.6–73.9)	13.6 (5.7–21.5)		40.2 (26.7–53.7)	25.4 (14.1–36.7)	27.1 (16.6–37.5)	7.3 (2.1–12.6)	
Quintile 5 (highest)	22.9 (14.7–31.1)	24.4 (15.1–33.8)	40.8 (31.5–50.1)	11.8 (5.2–18.4)		20.5 (8.6–32.4)	21.6 (11.3–31.9)	37.9 (25.3–50.5)	20.0 (10.0–29.9)		45.9 (28.9–62.9)	17.4 (6.9–27.9)	23.5 (8.0–39.1)	NR[b]	
Canadian regions															
Atlantic region	28.7 (20.2–37.1)	24.6 (15.5–33.7)	34.7 (23.9–45.5)	12.0 (5.0–19.0)	.074	32.2 (20.7–43.8)	14.5 (6.6–22.3)	43.5 (30.8–56.2)	9.8 (3.6–16.0)	.608	46.8 (35.7–57.9)	23.4 (13.8–33.0)	23.8 (12.3–35.3)	NR[b]	.770
Quebec	22.1 (14.3–29.9)	29.9 (20.1–39.7)	36.0 (25.6–46.5)	12.0 (5.0–19.1)		33.3 (22.5–44.0)	24.2 (14.3–34.0)	34.2 (23.3–45.1)	NR[b]		42.6 (31.3–53.9)	21.3 (11.9–30.8)	27.4 (17.6–37.1)	NR[b]	
Ontario	33.7 (27.1–40.3)	24.3 (16.9–31.8)	26.8 (20.8–32.8)	15.2 (8.5–21.8)		24.4 (15.4–33.3)	16.1 (9.6–22.6)	43.3 (30.8–55.9)	16.2 (8.4–24.0)		52.9 (44.0–61.7)	22.7 (14.6–30.7)	16.8 (9.4–24.1)	7.7 (3.1–12.3)	
Prairie region	43.7 (34.8–52.5)	20.0 (14.2–25.8)	26.3 (19.0–33.7)	10.0 (4.2–15.8)		30.7 (13.9–47.4)	NR[b]	38.8 (24.3–53.3)	16.2 (6.3–26.0)		48.6 (34.0–63.2)	25.1 (13.7–36.4)	13.7 (7.7–19.7)	NR[b]	
British Columbia	22.8 (14.8–30.9)	25.9 (15.1–36.6)	39.6 (26.8–52.4)	11.7 (3.9–19.5)		26.4 (5.5–47.4)	NR[b]	33.6 (14.3–53.0)	NR[b]		51.6 (38.1–65.0)	22.1 (11.9–32.3)	18.9 (9.3–28.5)	NR[b]	
Area of residence															
Rural	34.2 (26.6–41.7)	23.5 (17.3–29.6)	35.5 (28.0–43.0)	6.9 (3.5–10.3)	.076	25.6 (17.7–33.4)	15.7 9.6–21.9)	46.1 (36.1–56.2)	12.6 (5.9–19.2)	.434	53.7 (42.9–64.4)	27.6 (17.8–37.4)	12.2 (6.5–17.9)	NR[b]	.242
Urban	30.9 (26.6–35.2)	25.0 (20.0–29.9)	29.9 (25.1–34.6)	14.2 (10.1–18.4)		30.2 (23.5–36.8)	20.4 (14.6–26.2)	37.0 (29.7–44.3)	12.5 (8.1–16.8)		48.9 (42.6–55.1)	22.1 (17.0–27.2)	20.1 (15.2–24.9)	9.0 (5.7–12.3)	

Abbreviations: CI, confidence interval; NR, not reportable; SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component.

[a] Percentages are based on weighted numbers to reflect the Canadian population aged 18 years and older with mood and/or anxiety disorders living in the 10 provinces.

[b] Coefficient of variation > 33.3.

[c] Statistically significant at $p < .05$.

TABLE 3
Adjusted odds ratio of falling into "severe," "moderate" or "mild" disability categories compared to "no disability," by sociodemographic characteristics and type of disorder among Canadians aged 18 years and older with mood and/or anxiety disorders (n = 3361), 2014 SLCDC-MA

Sociodemographic characteristic	Level of disability	OR (95% CI)	*p*-value
Sex			
Women vs. men	Severe	1.1 (0.7–1.8)	.633
	Moderate	1.2 (0.7–2.0)	.434
	Mild	1.4 (0.9–2.3)	.167
	None	reference	
Age group (years)			
35–49 vs. 18–34	Severe	2.7[a] (1.4–5.3)	.004[a]
	Moderate	1.5 (0.8–2.8)	.220
	Mild	1.9[a] (1.0–3.6)	.048[a]
	None	reference	
50–64 vs. 18–34	Severe	4.5[a] (2.3–8.9)	< .001[a]
	Moderate	2.1[a] (1.1–4.0)	.035[a]
	Mild	2.2[a] (1.1–4.3)	.028[a]
	None	reference	
65+ vs. 18–34	Severe	2.2[a] (1.0–4.6)	.042[a]
	Moderate	1.4 (0.6–2.8)	.421
	Mild	1.4 (0.7–2.9)	.368
	None	reference	
Marital status			
Single, never married vs. married/living common-law	Severe	1.4 (0.7–2.5)	.348
	Moderate	1.4 (0.7–2.7)	.326
	Mild	1.1 (0.5–2.1)	.869
	None	reference	
Widowed/divorced/separated vs. married/living common-law	Severe	1.2 (0.7–2.1)	.606
	Moderate	0.9 (0.5–1.8)	.828
	Mild	0.7 (0.4–1.2)	.192
	None	reference	
Education level			
Less than secondary school graduation vs. post-secondary graduation	Severe	1.5 (0.8–2.7)	.174
	Moderate	1.0 (0.5–1.8)	.911
	Mild	0.9 (0.4–1.6)	.631
	None	reference	
Secondary school graduation vs. post-secondary graduation	Severe	1.2 (0.7–2.1)	.572
	Moderate	1.0 (0.5–1.8)	.985
	Mild	0.9 (0.5–1.5)	.668
	None	reference	
Some post-secondary vs. post-secondary graduation	Severe	0.9 (0.3–2.6)	.904
	Moderate	0.9 (0.3–2.6)	.803
	Mild	0.4 (0.1–1.2)	.092
	None	reference	

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either of the conditions alone.[30,31] Since epidemiological studies have found both mood and anxiety disorders to be prevalent with high rates of comorbidity,[32-35] we anticipate that comorbid mood and anxiety disorders result in substantial disability at the population level.

A similar distribution of disability was observed among men and women, despite the fact that the prevalence of mood and anxiety disorders is generally higher among women than men.[36] There is no consensus in the literature about the sex pattern in terms of the association between disability and mood and anxiety disorders, or between disability and mental disorders overall. While some studies suggest that women with depression are more likely to have a social and physical disability than their male counterparts,[27] others provide evidence of the opposite pattern.[8,10,14] The differences across studies may be due to differences in the way they define disability and in the composition of the study populations.

We found that age was associated with level of disability, that is, those who were older, especially those aged 50 to 64 years, had higher levels of disability compared to the youngest age group. These results are in concordance with age-related findings about the use of health services for mood and anxiety disorders[37] and may relate to the specific challenges this subpopulation faces, including the higher rates of concurrent physical conditions and conditions related to mental health.[7] It has previously been found that people with combined physical and mental conditions have increased odds of disability after controlling for sociodemographic characteristics, occupation and region.[38]

In addition, a study that explored the association between work stress and mental disorders found that working-age people who reported an imbalance between work and personal and/or family life were at greatest risk for mental disorders, regardless of gender.[39] People who must fill multiple roles, such as working and caring for aging parents or in-laws and children at the same time, tend to be between the ages of 45 and 65.[40] These individuals, known as the "sandwich generation," are expected to grow in number as people delay childbearing and as the government

TABLE 3 (continued)
Adjusted odds ratio of falling into "severe," "moderate" or "mild" disability categories compared to "no disability," by sociodemographic characteristics and type of disorder among Canadians aged 18 years and older with mood and/or anxiety disorders (n = 3361), 2014 SLCDC-MA

Sociodemographic characteristic	Level of disability	OR (95% CI)	*p*-value
Household income adequacy quintiles			
Quintile 1 (lowest) vs. quintile 5 (highest)	Severe	2.7[a] (1.3–5.9)	.01[a]
	Moderate	1.4 (0.6–3.0)	.405
	Mild	1.0 (0.5–2.2)	.951
	None	reference	
Quintile 2 (lower-middle) vs. quintile 5 (highest)	Severe	2.9[a] (1.3–6.3)	.008[a]
	Moderate	2.7[a] (1.1–6.3)	.024[a]
	Mild	1.4 (0.6–3.1)	.398
	None	reference	
Quintile 3 (middle) vs. quintile 5 (highest)	Severe	1.6 (0.7–3.3)	.235
	Moderate	1.5 (0.7–3.0)	.319
	Mild	0.9 (0.4–1.9)	.812
	None	reference	
Quintile 4 (upper-middle) vs. quintile 5 (highest)	Severe	1.4 (0.6–3.2)	.437
	Moderate	1.6 (0.8–3.3)	.217
	Mild	2.0 (0.9–4.1)	.080
	None	reference	
Canadian regions			
Atlantic region vs. Ontario	Severe	1.0 (0.5–1.8)	.960
	Moderate	1.2 (0.6–2.3)	.662
	Mild	1.6 (0.8–3.0)	.154
	None	reference	
Quebec vs. Ontario	Severe	0.9 (0.5–1.6)	.766
	Moderate	1.5 (0.8–2.9)	.216
	Mild	1.5 (0.8–2.9)	.172
	None	reference	
British Columbia vs. Ontario	Severe	0.9 (0.4–1.9)	.777
	Moderate	1.4 (0.6–3.2)	.389
	Mild	1.7 (0.8–3.7)	.185
	None	reference	
Prairie region vs. Ontario	Severe	1.7 (0.9–3.2)	.132
	Moderate	1.3 (0.6–2.6)	.466
	Mild	1.2 (0.6–2.2)	.663
	None	reference	
Area of residence			
Urban vs. rural	Severe	0.6 (0.4–1.0)	.071
	Moderate	0.6 (0.4–1.1)	.076
	Mild	0.7 (0.4–1.1)	.119
	None	reference	

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advocates for a shift from formal to informal caregiving for older adults.[41]

When the data were stratified by socioeconomic status, the household income adequacy and level of education were negatively associated with the level of disability among those with mood and/or anxiety disorders. Those with the lowest household income adequacy and an education level less than secondary school graduation had higher levels of disability than people with higher household income adequacy and level of education. The association between disability levels and education, however, may be confounded by household income as the OR of falling into severe, moderate or mild disability categories compared to the no disability category for those with less than post-secondary education was not statistically significant when adjusted for other factors including household income adequacy. In general, the results related to socioeconomic status from this study are consistent with other research that has found lower income and level of education to be associated with negative health outcomes.[42,43]

Another important finding from this study is the profound impact of mood and/or anxiety disorders on work function, especially among those with concurrent disorders. Mood and anxiety disorders vary in regard to their duration and severity; therefore, individuals with recurrent or chronic symptoms and those who have more severe symptoms might be particularly prone to work disability. While the survey data did not permit an examination of workplace absenteeism and presenteeism, the literature suggests that people with depressive and anxiety disorders have an elevated risk of work absence and impaired work performance.[44-46] Furthermore, it has been estimated that about 500 000 Canadians are absent from their workplace every day because of depression.[47] It was not possible to consider the potential impact of underemployment (i.e. people with qualifications that would allow them to attain better career opportunities had it not been for their mental illness), as this information was not collected in the 2014 SLCDC-MA.

TABLE 3 (continued)
Adjusted odds ratio of falling into "severe," "moderate" or "mild" disability categories compared to "no disability," by sociodemographic characteristics and type of disorder among Canadians aged 18 years and older with mood and/or anxiety disorders (n = 3361), 2014 SLCDC-MA

Sociodemographic characteristic	Level of disability	OR (95% CI)	p-value
Immigrant status			
Not an immigrant vs. immigrant	Severe	1.2 (0.4–3.7)	.699
	Moderate	1.8 (0.2–14.9)	.565
	Mild	1.5 (0.2–9.4)	.667
	No	reference	
Aboriginal status			
Not Aboriginal vs. Aboriginal	Severe	1.9 (0.7–5.4)	.202
	Moderate	2.0 (0.6–6.6)	.240
	Mild	1.8 (0.6–5.1)	.290
	None	reference	
Type of disorders			
Concurrent mood and anxiety disorders vs. anxiety disorders only	Severe	1.9[a] (1.1–3.4)	.021[a]
	Moderate	1.8 (1.0–3.2)	.070
	Mild	0.8 (0.5–1.3)	.362
	No	reference	
Mood disorders only vs. anxiety disorders only	Severe	0.9 (0.5–1.5)	.666
	Moderate	1.2 (0.7–2.2)	.583
	Mild	0.9 (0.5–1.6)	.7665
	None	reference	

Abbreviations: CI, confidence interval; OR, odds ratio; SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component; vs., versus.

[a] Significantly different from the reference at $p < .05$.

The high rates of work-related restrictions and disability found among those with mood and/or anxiety disorders in this study underscore the importance of initiatives such as the 2013 National Standard of Canada for Psychological Health and Safety.[48] The Standard, championed by the Mental Health Commission of Canada, is a voluntary set of guidelines, tools and resources for promoting employees' overall psychological health and preventing psychological harm due to workplace factors. It applies to everyone, regardless of their mental health status. The Standard supports Canada's mental health priorities as outlined in *Changing Directions, Changing Lives: The Mental Health Strategy for Canada*,[49] which recommends the wide adoption of psychological health and safety standards in Canadian workplaces.[50]

Strengths and limitations

One of the many strengths of this study is that we were able to stratify the analyses by type of disorder, permitting a comparison of the separate and combined impact of mood and anxiety disorders on health status, activity limitations, work-related restrictions and level of disability. A second strength of this study is its use of the HUI to define disability categories. The HUI is one of the leading instruments in the measurement of functional health, and the disability categories that are based on HUI have been validated for the assessment of disability and health-related quality of life.[22] It allows for the systematic measurement and comparison of disability between populations with specific characteristics.

Nevertheless, the results should be interpreted in light of several limitations. For instance, the identification of people with mood or anxiety disorders and their health activity, work-related and disability status were dependent on self-disclosure, with no third-party corroboration or verification. While this is the most practical method of assessing these health-related issues in a large population, self-report is susceptible to error due to social-desirability bias, recall bias and/or conscious non-reporting, resulting in potential under- or overestimation of disorder burden both individual and societal. Furthermore, since individuals affected by mood and/or anxiety disorders (particularly those with severe symptoms) may be less inclined to participate in such a survey, the estimates within are likely conservative.[51]

Of the respondents selected for the 2014 SLCDC-MA, 17% were deemed to be out-of-scope for any one of the following reasons: being incorrectly classified as having the condition in the 2013 CCHS, deliberately providing answers to be screened out of the survey, having emigrated or having died. Because the data were not adjusted for these out-of-scope cases, a comparison of the health outcomes between the adult population without mood and anxiety disorders based on the 2013 CCHS and the adult population with mood and/or anxiety disorders based on the 2014 SLCDC-MA was not performed in this study. While the findings from this study suggest that mood and anxiety disorders have a substantial impact on the health and well-being of those affected, we could not evaluate the difference between these two populations.

Another limitation of the study relates to the generalizability of the findings to the entire Canadian population. Individuals living in the three territories, and some populations known to be at risk for mental illness such as Aboriginal people living on reserves or Crown lands,[52,53] the homeless,[54] institutionalized residents[55,56] and full-time members of the Canadian Forces[57] were not included. For instance, it is well known that the prevalence of major depression among Canadian seniors living in long-term care facilities is higher (3–4 times) than those living in private dwellings,[55,58] and that the level of disability among those living in correctional facilities is much higher than those living in the community.[56,59] In light of this, the results of this study likely underestimate the impacts of mood and anxiety disorders on affected Canadians.

Conclusion

This is the first population-based Canadian study that provides a comprehensive overview of the general and mental health status, usual and work-related activities and

level of disability among those with mood and/or anxiety disorders.

Findings highlight the importance of early detection of symptoms and timely access to treatment in mitigating the negative impact of these disorders on people's health and ultimately, improving their well-being and participation in the workplace and day-to-day life. In addition, results will help to inform policies and programs that aim to promote positive mental health and well-being in the workplace, including workplace accommodations. Keeping those at highest risk for severe disability in the workplace longer may help mitigate some of the issues that challenge older adults' mental health (e.g. financial stress, social isolation).

The significant levels of disability associated with mood and/or anxiety disorders also point to the importance of tailoring treatment efforts to address activity and work limitations rather than focus too narrowly on symptom reduction. Furthermore, results emphasize the importance of promoting Canadians' mental health throughout the life course and in various life settings (i.e. school, workplace, community, senior residence, etc.) through anti-stigma strategies, public awareness, education and training.

Conflict of interest

The authors have no conflicts of interest to report.

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Authors' contributions

L. Loukine contributed to the paper concept, conducted statistical analysis and contributed to the manuscript writing. S. O'Donnell and E. Goldner contributed to the manuscript writing and revisions. L. McRae and H. Allen critically reviewed and revised the manuscript. All authors read and approved the final manuscript.

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Correlates of well-being among Canadians with mood and/or anxiety disorders

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Abstract

Introduction: Our objective was to examine variables associated with well-being as measured by high self-rated mental health (SRMH) and life satisfaction (LS), among Canadian adults (aged 18+) living with a mood and/or an anxiety disorder.

Methods: We used nationally representative data from the 2014 Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component (SLCDC-MA) to describe the association between well-being and self-management behaviours (physical activity, sleep and meditation) as well as perceived stress, coping and social support. We used multivariate logistic regression to model the relationship between these factors and measures of well-being.

Results: Approximately one in three individuals with mood and/or anxiety disorders reported high SRMH. The logistic regression models demonstrated that several characteristics such as being older, and reporting higher self-rated general health, fewer functional limitations, lower levels of perceived life stress, higher levels of perceived coping and higher levels of perceived social support were associated with higher levels of well-being. Self-management behaviours (including starting physical activity, meditation, adopting good sleep habits and attaining a certain number of hours of nightly sleep) were not significantly associated with measures of well-being in our multivariate model.

Conclusion: Canadian adults with mood and/or anxiety disorders who reported lower levels of perceived stress and higher levels of social support and coping were more likely to report high levels of well-being. This study contributes evidence from a representative population-based sample indicating well-being is achievable, even in the presence of a mood and/or an anxiety disorder.

Keywords: mood disorders, anxiety disorders, well-being, self-rated mental health, life satisfaction, adults, Canada

Highlights

- One in three Canadians living with a mood and/or an anxiety disorder report very good or excellent self-rated mental health. The sample reported a relatively high level of life satisfaction. Well-being was lowest among those with both a mood and an anxiety disorder.
- Perceived stress, coping and social support were significantly associated with well-being. We observed no significant associations between self-management behaviours and well-being.
- High levels of well-being are possible while living with a mood and/or an anxiety disorder.

Introduction

Canada's mental health strategy, *Changing Directions, Changing Lives*, encourages a shift in focus from pathology and symptoms in people experiencing a mental disorder to the concept of recovery, that is, "living a satisfying, hopeful and contributing life" in the *presence* of mental health problems.[1] Well-being is a positive state that is often defined in terms of hedonic, or emotional, well-being and eudemonic, or functional, well-being.[2] Hedonic well-being often includes the presence of positive emotions and life satisfaction, while eudemonic well-being includes concepts such as self-actualization and finding meaning in life.

Both the Public Health Agency of Canada (PHAC) and the World Health Organization (WHO) approach mental health from a well-being perspective. PHAC defines mental health as "the capacity of each and all of us to feel, think, and act in ways that enhance our ability to enjoy life and deal with the challenges we face. It is a positive sense of emotional and spiritual well-being that respects the importance of culture, equity, social justice, interconnections and personal dignity."[3] This definition is similar to that of the World Health Organization, where "mental health is a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community."[4]

The concept of quality of life (QOL) is related to, but distinct from well-being. According to the WHO, QOL refers to "individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations,

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standards and concerns."[5] Many measures of quality of life include a subjective evaluation of life satisfaction (LS), either overall or with regard to specific domains.

In people living with a mood disorder, research has shown that well-being is associated with higher levels of overall functioning,[6] and a number of lifestyle interventions have shown promise for enhancing well-being.[7] However, most studies examining well-being among people living with a mood and/or an anxiety disorder are based on small, clinical samples and are not representative of the Canadian population. The purpose of this study is to examine factors associated with well-being, as measured by high self-rated mental health (SRMH) and satisfaction with life in general, among a representative sample of Canadians living with a mood and/or an anxiety disorder from the 2014 Survey on Living with Chronic Diseases in Canada (SLCDC). These factors include several self-management behaviours as well as perceived stress, coping and social support.

Self-management behaviours for mood and/or anxiety disorders

A number of behaviours are associated with a reduction of symptoms and better clinical outcomes among people living with mood and/or anxiety disorders. In our study, "self-management behaviours" refer to starting physical activity or meditation to manage one's disorder, adopting good sleep habits as well as attaining recommended amounts of sleep as measured by usual hours of sleep per night. These behaviours may be initiated by the individual, or suggested by a health care professional as part of a holistic approach to treatment. Each of these is described in relation to well-being below.

Physical activity

A range of behaviours that contribute to well-being may be adopted by people living with a mood and/or an anxiety disorder of their own accord, or at the suggestion of a health care professional as part of a clinical approach to care. Although physical activity is fairly well established in the literature for reducing symptoms in people experiencing mood disorders,[8] there is also a growing body of evidence that it may improve well-being in people experiencing major depression and/or depressive symptoms.[8-10] For example, Galper et al.[10] found a positive graded dose-response relationship between cardiorespiratory fitness and estimated mean general well-being, as well as a significant relation between the amount of physical activity and estimated general well-being scores.

The relationship between anxiety disorders and physical activity has been less frequently studied, and responses to exercise appear to vary by type of anxiety disorder.[8,11] Nevertheless, there is some preliminary evidence that physical activity may be associated with an increase in well-being among people experiencing certain types of anxiety disorders, including post-traumatic stress disorder, generalized anxiety disorder, social anxiety disorder and obsessive compulsive disorder.[12]

Sleep

Sleep dysfunction is associated with both mood and anxiety disorders.[13] Sleep quantity and quality among people living with mood and/or anxiety disorders are also associated with measures of well-being. For example, Hamilton et al.[14] found that respondents living with major depressive disorder (MDD) who slept from 6 to 8.5 hours a night had higher psychological well-being as measured by Ryff's six dimensions of psychological well-being[15] than those sleeping either more or less. Peth et al.[16] found that participants diagnosed with MDD who were given the opportunity to nap during the day reported an increase in their subjective well-being, as compared to those who were kept awake with controlled activity during the same period.

Meditation

The use of meditation, particularly "mindfulness" meditation, in the treatment of mood and anxiety disorders has shown promising results in many treatment studies.[17] Other types of meditation, such as "kindness-based meditation," have also shown promise, though with inconsistent effects on the well-being of participants experiencing a mood disorder.[18] In one qualitative study examining individual coping strategies, many participants diagnosed with bipolar disorder (a mood disorder) reported using meditation as a means to self-manage the negative experiences of their disorder.[19]

Stress, coping and social support

Stress, coping and social support each have a well-documented relationship with well-being. Prolonged exposure to stressors can increase the risk of developing mental disorders as well as physical health problems,[20,21] and there is an inverse relationship between perceived stress and well-being.[22] *Coping* refers to the set of cognitive and behavioural strategies used by an individual to manage the demands of stressful situations, by solving problems or regulating emotions.[23] Interventions that enhance positive coping skills have been associated with higher levels of well-being.[24] Social support is consistently associated with well-being among people experiencing a mood and/or an anxiety disorder. For example, Kuehner and Buerger[25] found that the presence of an intimate partner was associated with increased quality of life ratings in the psychological and social relationship domains of subjective quality of life among participants experiencing unipolar depression. Panayiotou and Karekla[26] found that among participants with a diagnosis of either generalized anxiety disorder, social anxiety disorder or panic disorder, higher perceived social support was predictive of higher psychological quality of life.

Although the evidence associating these factors with well-being in people living with mood and/or anxiety disorders is growing, there is still a clear need for more research to understand correlates of well-being in this population. Most studies to date examine these relationships in small convenience samples and clinical studies. Research about people living with mental disorders often focusses on negative outcomes (distress and dysfunction) even though well-being is recognized as an important and achievable outcome for people living with mental disorders.[1] Our study will therefore add to the literature by describing well-being in a representative sample of Canadians living with a mood and/or an anxiety disorder, and by examining the association of self-management behaviours and stress, coping and social support factors with self-rated mental health (SRMH) and life satisfaction (LS) in this sample. Based on the literature available to date, we predicted that each of the self-management behaviours, as well as lower stress and higher social support and coping, would be positively associated with higher SRMH and LS.

Methods

We analyzed data from the 2014 Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component (SLCDC-MA). The survey population consists of 3361 individuals aged 18 years and older who reported in the 2013 Canadian Community Health Survey that they have been diagnosed with mood and/or anxiety disorders by a health professional. The methodology of the data collection and the sample of SLCDC-MA are described in the methodological paper that is included in this issue of *Health Promotion and Chronic Disease Prevention in Canada*.[27]

Well-being

We used two measures of well-being in this study: SRMH and LS. SRMH is an individual's global self-assessment of their mental health. We considered those who self-rated their mental health as being "excellent" or "very good" to have high SRMH, and those who reported it as "good," "fair" or "poor" to have low SRMH. Dichotomizing the variable in this manner creates a group that is consistent with the way this indicator is reported by Statistics Canada and PHAC.[28,29]

Life satisfaction is a global assessment, evaluation or judgment of satisfaction with one's life based on an individual's own criteria.[30] Consistent with Organisation for Economic Co-operation and Development guidelines for measuring subjective well-being, participants were asked "Using a scale of 0 to 10, where 0 means 'very dissatisfied' and 10 means 'very satisfied,' how do you feel about your life as a whole right now?" Analysis of the LS data showed that responses were skewed and did not follow a normal distribution. Therefore, we did not use those responses as a continuous variable for analysis. Instead, we dichotomized the scale into two categories using a median split: high level of LS (with scores higher than or equal to 8), and low level of LS (with scores lower than 8). Other cut-offs for LS have not been widely used, and the choice of a median split maximizes the power to detect differences between two equal groups. Because this cut-off is based on the underlying distribution of scores, reporting prevalences are not meaningful; however, group comparisons of prevalences are valid.

Health and functioning

We evaluated the self-perceived general health of the participants using a single question. The response categories were "excellent," "very good," "good," "fair" and "poor."

We assessed functional limitations through a set of questions asking respondents how much their mood and/or anxiety disorder limited them in seven different areas in the past 12 months: recreation, leisure or hobbies; exercise or playing sports; social activities with family or friends; household chores; shopping and running errands; travelling and vacations; and bathing or dressing. Respondents were categorized into three groups: those reporting no or only a little functional limitation, those reporting a lot of limitations in one or two areas and those reporting a lot of limitations in three or more areas.

Behaviours used to self-manage mood and/or anxiety disorders (physical activity, sleep and meditation)

We identified exercise behaviours using combined responses to several questions. Respondents were asked if they started exercising in order to manage their mood and/or anxiety disorder, whether they still did exercise and how often they exercised. Categories of exercise behaviour included (1) started exercising because of diagnosis to manage condition and continued to do so every day of the week; (2) started exercising and continued 4 to 6 times a week; (3) started exercising and continued 2 to 3 times a week or less; (4) started exercising after diagnosis but stopped; and (5) never started exercising. We excluded participants who reported that they never started exercising because they already were exercising for other reasons from analyses examining physical activity (n = 282).

We created two sleep habit variables based on responses to questions about sleep. Respondents were asked if they adopted good sleep habits (e.g. keeping a regular sleep schedule) to manage their mood and/or anxiety disorder ("yes" or "no") and how long they usually spend sleeping each night (we grouped responses into "less than 6 hours," "6 hours to less than 9 hours" or "9 hours and more").

Finally, respondents reported whether they used meditation to help manage their condition ("yes" or "no").

Stress, coping and social support

We measured perceived stress using the following question: "Thinking about the amount of stress in your life, would you say that most days are...?" Response categories were: "not at all stressful," "not very stressful," "a bit stressful," "quite a bit stressful" and "extremely stressful." The survey asked two questions that addressed ability to handle unexpected and difficult problems and day-to-day demands, which we used to measure coping. We considered coping ability to be high among those who had a score of at least 8 on the sum of the two coping questions.

Social support is the resources provided by other people to enhance an individual's well-being. It can include both tangible support, e.g. assistance with activities and physical resources, and intangible support, e.g. provision of information, affection or emotional assistance.[31] Ten items from the Social Provisions Scale (SPS)[32] were included on the SLCDC-MA, and respondents answered to what degree they agreed with each statement (e.g. "There are people who I can depend on for help if I really need it."). The SPS measures the concepts of reliable alliance, social integration, guidance and attachment. Participants whose mean score on the SPS was 3 or above (corresponding to an average response of "agree" or "strongly agree") were classified as having a high level of social support.

Analysis

In this study, we used descriptive data analysis to describe the well-being of individuals with mood and/or anxiety disorders. We examined the prevalence of high well-being by sociodemographic group, type of disorder, health and functioning, behaviours used to manage mood and/or anxiety disorders and stress, coping and social support variables. We also examined sex-stratified prevalences to identify possible effect modification. We performed logistic regression analysis in order to look at the associations between well-being and a) sociodemographic factors; b) health and functioning; c) self-management behaviours; and d) stress, coping and social support. We built a series of hierarchical models, adding

sequential blocks of variables as described above. We performed all analyses using SAS Enterprise Guide version 5.1 (SAS Institute, Cary, NC, USA). We calculated variance using balance repeated replicate weights in the PROC SURVEY suite of procedures, with the weights provided by Statistics Canada.

Results

Approximately one in three respondents reported high SRMH (31.4%). Among those diagnosed with both mood and anxiety disorders, a significantly lower proportion reported high LS or high SRMH than those with only an anxiety disorder or only a mood disorder (Figure 1). Mean LS ratings were significantly higher for those with anxiety only (7.49, 95% CI: 7.28–7.70) as compared to those with a mood disorder only (mean 7.01, 95% CI: 6.84–7.18). Those with either a mood or an anxiety disorder only had significantly higher LS ratings than those with both disorders (mean 6.52, 95% CI: 6.30–6.74).

Bivariate analyses

Sociodemographic factors

In bivariate analyses (Table 1), a higher proportion of individuals aged 65 and older reported high SRMH (39.5%) in comparison to those aged 35 to 49 years (26.3%). A higher proportion of those who were married or living common-law reported high LS (52.7%) as compared to those who were single or never married (38.6%) or widowed, divorced or separated (36.8%). No significant differences in the level of well-being were observed by sex, education level, immigrant status or urban/rural residence.

Health and functioning

The proportion of respondents reporting high SRMH and high LS increased with higher levels of self-reported general health. A significantly higher proportion of individuals who reported no or only a little functional limitation had higher LS or SRMH than those with 1 to 2 limitations or 3 or more limitations. Those with 1 to 2 limitations had higher levels of well-being than those with 3 or more limitations.

Self-management behaviours

Respondents who reported sleeping from 6 to less than 9 hours per night had a significantly higher prevalence of high SRMH and high LS than those who slept less than 6 hours. There were no significant differences between those who reported starting meditation, or starting or continuing an exercise routine or adopting good sleep habits.

Stress, coping and social support

The prevalence of high SRMH and of high LS increased with decreasing reported life stress (e.g. 20.0% of those reporting life as "quite a bit or extremely stressful" reported high SRMH, vs. 65.3% of those reporting life as "not at all stressful"). Better coping was associated with a higher prevalence of high SRMH and high LS compared to those who reported lower levels of coping (59.5% vs. 21.8% for SRMH and 61.9% vs. 40.9% for LS for those with high vs. low coping, respectively). Similarly, higher levels of well-being were found among those with high perceived social support versus those with low perceived social support (35.5% vs. 14.3% for SRMH and 51.8% vs. 22.8% for LS, respectively).

We examined sex-stratified prevalences (data not shown), and there was no evidence for important differences in the pattern of associations between men and women.

Logistic regression

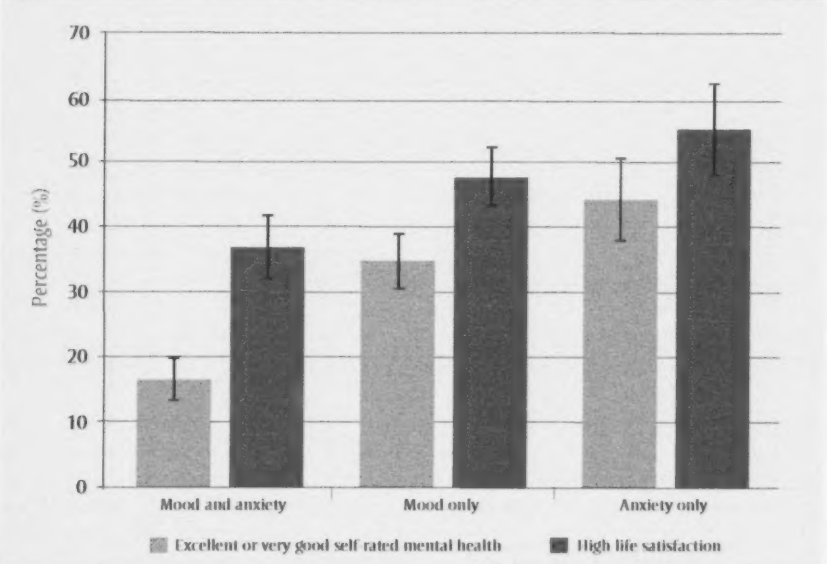
The results of hierarchical logistic regression models are presented in Table 2 (SRMH) and Table 3 (LS).

Self-rated mental health

In the initial model including only sociodemographic variables (SRMH Model 1), only age and income were significantly associated with high SRMH (Table 2). Respondents aged 65 and older were almost twice as likely to report high SRMH as those aged 35 to 49 years. The odds of reporting high SRMH increased with increasing income. Marital status, sex, education, immigrant status and urban/rural status were not significant predictors of high SRMH.

The likelihood of reporting high SRMH was significantly related to health and functioning variables added in Model 2. Notably, those reporting excellent self-rated health were almost 13 times as likely to also report high SRMH, and those in very good health were 4 times as likely. Respondents reporting having no or 1 to 2 functional limitations were more likely to report high SRMH than those reporting

FIGURE 1
Proportion of Canadians aged 18 years and older with a mood and/or an anxiety disorder reporting high self-rated mental health or life satisfaction, SLCDC-MA 2014



Abbreviation: SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component.

Note: Error bars represent 95% confidence intervals.

TABLE 1
Percentage of respondents with high self-rated mental health or high life satisfaction by sociodemographic, health and functioning, self-management and stress, coping and social support characteristics, Canada, 2014 SLCDC-MA

Characteristics	Self-rated mental health	Life satisfaction
	High level % (95% CI)	High level % (95% CI)
Sex		
Males	29.9 (24.9–34.8)	43.1 (37.4–48.7)
Females	32.2 (29.1–35.4)	48.0 (44.4–51.6)
Age		
18–34	31.2 (25.2–37.1)	49.4 (42.8–55.9)
35–49	26.3 (21.1–31.5)	43.6 (37.0–50.1)
50–64	32.2 (27.8–36.6)	43.3 (38.1–48.5)
65+	39.5 (34.4–44.6)	51.5 (46.1–56.9)
Marital Status		
Single/never married	27.2 (22.2–32.3)	38.6 (32.9–44.4)
Widowed/divorced/separated	27.8 (22.8–32.7)	36.8 (31.0–42.5)
Married/living common-law	34.4 (30.4–38.4)	52.7 (48.2–57.2)
Highest education level		
Less than secondary school graduation	31.1 (23.2–39.0)	43.2 (34.0–52.4)
Secondary school graduation	30.3 (24.0–36.5)	43.3 (36.3–50.2)
Some post-secondary + post-secondary graduation	31.4 (28.3–34.6)	47.2 (43.5–50.8)
Household income quintile		
Q1 (lowest quintile)	23.5 (19.1–27.9)	33.9 (28.2–39.5)
Q2	31.0 (25.2–36.8)	37.6 (31.2–44.0)
Q3	32.8 (26.4–39.2)	47.0 (39.9–54.2)
Q4	32.4 (26.2–38.6)	53.9 (47.1–60.8)
Q5 (highest quintile))	39.2 (32.3–46.0)	61.6 (54.0–69.2)
Immigrant		
Yes	30.0 (20.9–39.1)	46.4 (35.7–57.2)
No	31.6 (28.8–34.4)	46.2 (43.0–49.4)
Urban and rural status		
Urban	30.0 (26.9–33.1)	44.7 (41.2–48.2)
Rural	37.7 (32.5–42.9)	53.1 (48.2–58.0)
Self-rated health		
Excellent	70.1 (60.4–79.7)	65.3 (55.2–75.4)
Very good	45.3 (39.5–51.1)	60.8 (54.0–67.5)
Good	23.6 (19.9–27.4)	44.1 (39.3–48.8)
Fair	13.6 (9.9–17.3)	28.5 (22.5–34.4)
Poor	12.8 (7.6–17.9)[a]	18.0 (10.5–25.4)[a]
Functional limitations		
No or only a little limitations	41.0 (37.3–44.6)	53.4 (49.3–57.5)
1–2 limitations	21.0 (15.2–26.9)	42.7 (36.2–49.3)
3 limitations or more	7.9 (4.7–11.1)[a]	24.1 (18.0–30.3)

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3 or more. Finally, those with only a mood disorder or only an anxiety disorder were more likely to report high SRMH than those with both a mood and an anxiety disorder. After entering health variables, income was no longer significantly associated with high SRMH.

Self-management behaviours were entered in Model 3. None of these variables were significantly associated with high SRMH. Stress, coping and social support variables were entered in Model 4 (excluding self-management behaviours). When these variables were included in the model, the association between sex and high SRMH became significant, with women being 1.5 times as likely to report high SRMH as men. Age continued to be significant. Health and functioning variables continued to be significant, although having only a mood disorder was no longer significant. All stress, coping and social support variables were associated with reporting high SRMH. Decreasing levels of perceived stress were associated with increasing odds of high SRMH. Those who reported better coping skills or more social support were also more likely to report high SRMH.

Life satisfaction

Results for LS (Table 3) are broadly similar to those for SRMH. In Model 1, both younger (18–34) and older ages (65+) were associated with higher odds of high LS, as compared to those aged 35 to 49 years. People who were married or living with a common-law spouse were more likely to report high LS as compared to people who were single. There was a graded association with income; the odds of reporting high LS increased with higher income. There were no significant associations with sex, education, immigration status or urban/rural status in the sociodemographic-only model.

When adding health and functioning variables (Model 2), the odds of reporting high LS increased with better self-rated health. Those that reported fewer functional limitations also had higher odds of reporting high LS, as compared to those with three or more limitations. In contrast to the model predicting SRMH, there were no significant differences between those with an anxiety disorder only, mood disorder only or both mood and anxiety disorders. When health and functioning variables were accounted for, most of the

TABLE 1 (continued)
Percentage of respondents with high self-rated mental health or high life satisfaction by sociodemographic, health and functioning, self-management and stress, coping and social support characteristics, Canada, 2014 SLCDC-MA

Characteristics	Self-rated mental health	Life satisfaction
	High level % (95% CI)	High level % (95% CI)
Type of disorder		
Both mood and anxiety	16.4 (13.1–19.6)	36.9 (31.9–41.9)
Mood only	34.7 (30.5–38.9)	47.8 (43.2–52.4)
Anxiety only	44.2 (37.9–50.5)	55.0 (48.1–62.0)
Exercise		
Started exercising, continued every day	30.8 (23.7–37.9)	44.7 (36.1–53.3)
Started exercising, continued 4–6X/wk	43.0 (34.5–51.5)	59.7 (51.0–68.3)
Started exercising, continued 2–3X/wk or less	29.2 (23.5–35.0)	51.8 (45.2–58.4)
Started exercising but stopped	29.4 (23.1–35.8)	40.0 (33.1–46.9)
Never started exercising	30.2 (25.9–34.6)	41.2 (36.5–45.8)
Adopted good sleep habits after diagnosis		
Yes	30.0 (26.9–33.2)	45.2 (41.7–48.6)
No	34.5 (29.5–39.4)	48.7 (43.0–54.3)
No. of hours of sleep (usual) per night		
Less than 6 hours	20.6 (15.5–25.8)	32.4 (25.4–39.3)
6 hours to less than 9 hours	34.6 (31.2–38.0)	50.2 (46.4–54.1)
9 hours or more	30.2 (23.7–36.8)	45.0 (38.1–51.9)
Used meditation to manage condition		
Yes	31.4 (27.4–35.4)	46.3 (42.0–50.6)
No	31.3 (27.8–34.8)	46.1 (41.9–50.3)
Perceived stress		
Not at all stressful	65.3 (51.3–79.2)	61.7 (48.2–75.2)
Not very stressful	46.8 (40.8–52.9)	61.4 (55.1–67.6)
A bit stressful	33.1 (29.0–37.2)	49.2 (44.4–53.9)
Quite a bit or extremely stressful	20.0 (16.4–23.6)	35.2 (30.4–39.9)
Coping		
High level of coping	59.5 (53.6–65.5)	61.9 (56.0–67.7)
Low level of coping	21.8 (19.1–24.5)	40.9 (37.4–44.4)
Perceived social support		
High level of social support	35.5 (32.4–38.6)	51.8 (48.2–55.3)
Low level of social support	14.3 (10.6–18.0)	22.8 (17.6–28.1)

Abbreviations: CI, confidence interval; Q, quintile; SLCDC-MA, Survey on Living with Chronic Diseases in Canada–Mood and Anxiety Disorders Component; X/wk, times per week.

Notes: Self-rated mental health (SRMH) was considered high if respondents reported very good or excellent SRMH; life satisfaction (LS) was considered high if participants reported a score of 8 or higher on a scale of 0–10.

[a] Interpret these results with caution as they have a coefficient of variation between 16.6% and 33.3%.

income associations became non-significant, except that the odds of reporting high LS continued to be higher in the highest income group as compared to the lowest income groups.

We observed no significant associations between life satisfaction and self-management behaviours when these variables were added to the model (Model 3); however, all stress, coping and social support variables yielded significant associations (Model 4). Those reporting lower levels of life stress had higher odds of reporting high LS, as compared to those with the highest level of life stress. Those who reported better coping skills and more social support had significantly higher odds of reporting high LS than those with low coping skills and low levels of social support. When stress, coping and social support variables were added, women had significantly greater odds of reporting high LS, as compared to men. Marital status and income (highest income group only) continued to be significant in this model.

Discussion

Overall, one-third of Canadians who reported that they have been diagnosed with a mood disorder and nearly half of Canadians with an anxiety disorder reported very good or excellent SRMH. However, only 16% of those with both a mood and an anxiety disorder reported very good or excellent SRMH. Levels of LS were also relatively high, with a mean rating of 6.98 for the sample overall, and even higher means for respondents reporting only a mood disorder (7.01) or only an anxiety disorder (7.49). The prevalence of high LS was significantly lower for those with both a mood and an anxiety disorder than it was for those with only one disorder.

Bivariate analyses demonstrated that the prevalence of high SRMH or high LS varied by sociodemographic characteristics, health and functioning and stress, coping and social support. However, of the self-management behaviours, there were only significant differences associated with hours of sleep.

A significantly greater proportion of older adults (aged 65 +) reported a high level of SRMH than adults aged 35 to 49. This relationship persisted in the multivariate models for both SRMH and LS. However, when stress, coping and social support

TABLE 2
Logistic regression models predicting high self-rated mental health (SRMH) among Canadians aged 18 years and older with mood and/or anxiety disorders

	SRMH			
	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Sex				
Males	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Females	1.2 (0.9–1.6)	1.2 (0.9–1.7)	1.2 (0.9–1.7)	1.5 (1.0–2.1)[a]
Age				
18–34	1.4 (0.9–2.1)	0.9 (0.6–1.5)	0.9 (0.6–1.5)	0.9 (0.6–1.5)
35–49	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
50–64	1.3 (0.9–1.8)	1.6 (1.1–2.3)[a]	1.5 (1.0–2.3)[a]	1.5 (1.0–2.2)
65+	1.9 (1.3–2.8)[a]	2.3 (1.5–3.5)[a]	2.2 (1.5–3.4)[a]	1.8 (1.1–2.8)[a]
Marital status				
Single/never married	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Widowed/divorced/separated	1.0 (0.6–1.4)	0.9 (0.6–1.4)	0.9 (0.6–1.4)	0.9 (0.5–1.5)
Married/living common-law	1.2 (0.8–1.7)	1.0 (0.6–1.4)	1.0 (0.7–1.5)	1.0 (0.7–1.6)
Highest education level				
Less than secondary school graduation	1.1 (0.7–1.7)	1.0 (0.6–1.8)	1.1 (0.6–1.9)	1.0 (0.5–2.0)
Secondary school graduation	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Some post-secondary + post-secondary graduation	1.0 (0.7–1.4)	0.9 (0.6–1.3)	0.9 (0.6–1.3)	0.9 (0.6–1.4)
Household income quintile				
Q1 (lowest quintile)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Q2	1.5 (1.0–2.2)	1.1 (0.7–1.7)	1.0 (0.7–1.7)	1.0 (0.6–1.8)
Q3	1.7 (1.1–2.6)[a]	1.0 (0.6–1.6)	1.0 (0.6–1.6)	0.9 (0.5–1.5)
Q4	1.5 (1.0–2.4)[a]	0.8 (0.5–1.2)	0.8 (0.5–1.3)	0.7 (0.4–1.1)
Q5 (highest quintile)	2.2 (1.4–3.4)[a]	1.1 (0.7–1.9)	1.1 (0.7–1.9)	0.9 (0.5–1.6)
Immigrant status				
Yes	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
No	1.1 (0.7–1.8)	1.3 (0.7–2.2)	1.3 (0.7–2.3)	1.2 (0.7–2.1)
Urban and rural status				
Urban	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Rural	1.3 (0.9–1.7)	1.2 (0.9–1.7)	1.2 (0.9–1.6)	1.3 (0.9–1.9)
Self-rated health				
Excellent		12.8 (6.3–26.3)[a]	12.4 (5.9–26.0)[a]	8.1 (3.6–18.3)[a]
Very good		4.4 (2.5–7.8)[a]	4.6 (2.5–8.3)[a]	3.1 (1.6–6.1)[a]
Good		1.5 (0.9–2.6)	1.5 (0.9–2.7)	1.1 (0.6–2.1)
Fair		0.9 (0.5–1.7)	0.9 (0.5–1.7)	0.8 (0.4–1.5)
Poor		1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Functional limitations				
3+ limitations		1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
1–2 limitations		2.3 (1.3–4.0)[a]	2.3 (1.3–4.0)[a]	2.3 (1.3–4.1)[a]
No or only a little limitations		4.6 (2.8–7.5)[a]	4.7 (2.9–7.7)[a]	3.3 (2.0–5.5)[a]

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variables were added to the LS model, this relationship was no longer significant. While the literature indicates that there appear to be lower levels of mental health disorders and psychological distress among older adults,[33] it is interesting to see that even among adults with a mood and/or an anxiety disorder older age is associated with higher levels of well-being. Whether this is an age or cohort effect is an important consideration.

Women were more likely to have high SRMH or LS than men once stress, coping and social support variables were included in the model. Higher income was associated with greater odds of LS and SRMH, which is consistent with studies demonstrating that higher income is associated with higher subjective well-being.[34] After adding health variables (Model 2), these relationships were attenuated for LS, and were no longer significant for SRMH. Because of the reciprocal relationship between health and income, it is important for future research to investigate this relationship. Education was not associated with higher well-being in this population. It may be that the effects of education are mediated by income and therefore including both in the model resulted in non-significant results for education.

Those who were married or living in common-law relationships had significantly higher odds of reporting high LS than those who were single/never married or widowed/divorced. This is consistent with previous literature indicating that being single, separated, divorced or widowed is associated with poorer mental health outcomes.[35] There is some literature to suggest that it is not merely having a relationship, but rather the quality of the relationship that is the better predictor of well-being.[36] The large and significant associations we observed with social support also support this idea.

In contrast to previous findings that have shown the benefits of exercise for improving mood and well-being in people experiencing depression and/or many of the anxiety disorders,[8-12] in our sample, starting and/or continuing exercise as a self-management behaviour was not associated with significantly higher levels of well-being. However, the measure used in our study did not include actual levels of physical activity, and we excluded

TABLE 2 (continued)
Logistic regression models predicting high self-rated mental health (SRMH) among Canadians aged 18 years and older with mood and/or anxiety disorders

	SRMH			
	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Type of disorder				
Both mood and anxiety		1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Mood only		1.7 (1.2–2.3)[a]	1.7 (1.2–2.3)[a]	1.4 (0.9–1.9)
Anxiety only		2.3 (1.5–3.5)[a]	2.4 (1.6–3.6)[a]	2.1 (1.3–3.2)[a]
Exercise				
Started exercising, continued every day			0.9 (0.5–1.5)	
Started exercising, continued 4–6X/wk			1.1 (0.6–1.9)	
Started exercising, continued 2–3X/wk or less			0.7 (0.4–1.2)	
Started exercising but stopped			1.0 (Ref)	
Haven't started exercising			0.8 (0.5–1.4)	
Adopted good sleep habits after diagnosis				
Yes			0.9 (0.7–1.3)	
No			1.0 (Ref)	
No. hours of sleep usually slept per night				
Less than 6 hours			1.0 (Ref)	
6 hours to less than 9 hours			1.0 (0.7–1.6)	
9 hours or more			1.3 (0.7–2.2)	
Used meditation to manage condition				
Yes			1.2 (0.9–1.7)	
No			1.0 (Ref)	
Perceived stress				
Not at all stressful				4.3 (1.9–9.8)[a]
Not very stressful				2.4 (1.6–3.6)[a]
A bit stressful				1.7 (1.2–2.4)[a]
Quite a bit or extremely stressful				1.0 (Ref)
Coping				
High level of coping				4.2 (3.0–6.0)[a]
Low level of coping				1.0 (Ref)
Perceived social support				
High level of social support				1.7 (1.1–2.7)[a]
Low level of social support				1.0 (Ref)

Abbreviations: CI, confidence interval; OR, odds ratio; Q, quintile; Ref, reference group; SRMH, self-rated mental health; X/wk, times per week.

Notes: Self-rated mental health (SRMH) was considered high if respondents reported "very good" or "excellent" SRMH.

Model 1 is the initial model including only sociodemographic variables. Model 2 includes sociodemographic and health and functioning variables. Model 3 includes these variables as well as self-management behaviours. Model 4 includes sociodemographic, health and functioning, and stress, coping and social support variables, but not self-management variables.

[a] Statistically significant at $p < .05$.

respondents who reported that they were already exercising. Future research should rely on stronger measures of physical activity, including levels of physical activity, as well as reasons for physical activity. Respondents who slept from 6 to less than 9 hours per night, as opposed to 6 hours or less, reported higher levels of well-being, but this relationship did not persist in the logistic regression models.

Perhaps surprisingly, given its current popularity in mental health treatment, meditation was not a significant predictor of well-being in our sample. It is difficult to speculate why, given that we do not have specific details as to the type of meditation, frequency and duration of practice and/or formal training that participants had when engaging in meditative practices. Our results, however, are not inconsistent with the literature, which has found mixed results on the impact of meditation on well-being.[18] Our study describes a nationally representative sample of people experiencing mood and/or anxiety disorders who are engaging in what they consider to be meditation in a normal life setting, which is an important contribution to the literature on this topic. However, more detailed research is needed before drawing any conclusions.

In the multivariate logistic regression models, lower stress, higher levels of social support and higher levels of coping skills were all significantly associated with high odds of well-being. Given that successful coping often includes strategies that are consistent with skills promoted in treatment,[19] one would expect healthy coping strategies to promote well-being. Likewise, those who reported a high level of perceived social support were more likely to report high SRMH and LS, which is consistent with the literature on well-being among those with mood and anxiety disorders.[25,26]

Strengths and limitations

This study examines well-being in a representative sample of the Canadian household population living with mood and/or anxiety disorders. It provides a useful description of the prevalence of well-being and its relationship to self-management behaviours and stress, coping and social support in this population. This sample differs from most other studies of this topic, which tend to focus on small,

TABLE 3
Logistic regression models predicting high life satisfaction among Canadians aged 18 years and older with mood and/or anxiety disorders

	LS			
	Model 1	Model 2	Model 3	Model 4
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sex				
Males	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Females	1.3 (1.0–1.8)	1.3 (1.0–1.8)	1.3 (1.0–1.8)	1.4 (1.0–2.0)[a]
Age				
18–34	1.8 (1.2–2.9)[a]	1.6 (1.0–2.5)	1.5 (0.9–2.5)	1.6 (1.0–2.6)
35–49	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
50–64	1.0 (0.7–1.5)	1.2 (0.8–1.7)	1.1 (0.8–1.7)	1.1 (0.7–1.6)
65+	1.6 (1.1–2.3)[a]	1.7 (1.1–2.6)[a]	1.7 (1.1–2.6)[a]	1.4 (0.9–2.1)
Marital status				
Single/never married	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Widowed/divorced/separated	1.2 (0.8–1.9)	1.2 (0.8–1.9)	1.2 (0.8–1.9)	1.3 (0.8–2.0)
Married/living common-law	1.8 (1.2–2.7)[a]	1.7 (1.1–2.5)[a]	1.7 (1.1–2.6)[a]	1.8 (1.2–2.8)[a]
Highest education level				
Less than secondary school graduation	1.2 (0.7–2.1)	1.2 (0.7–2.1)	1.2 (0.7–2.1)	1.5 (0.8–2.6)
Secondary school graduation	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Some post-secondary + post-secondary graduation	0.9 (0.7–1.3)	0.9 (0.6–1.3)	0.9 (0.6–1.2)	0.9 (0.6–1.3)
Household income quintile				
Q1 (lowest quintile)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Q2	1.1 (0.7–1.6)	0.8 (0.5–1.3)	0.8 (0.5–1.3)	0.8 (0.5–1.3)
Q3	1.8 (1.2–2.7)[a]	1.2 (0.7–1.9)	1.2 (0.7–1.9)	1.1 (0.7–1.9)
Q4	2.2 (1.5–3.4)[a]	1.5 (1.0–2.4)	1.5 (0.9–2.4)	1.5 (0.9–2.4)
Q5 (highest quintile)	3.1 (1.9–4.9)[a]	2.0 (1.2–3.4)[a]	2.0 (1.2–3.3)[a]	1.9 (1.1–3.4)[a]
Immigrant status				
Yes	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
No	1.0 (0.6–1.7)	1.0 (0.6–1.8)	1.1 (0.6–1.8)	1.0 (0.6–1.7)
Urban and rural status				
Urban	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Rural	1.2 (0.9–1.6)	1.2 (0.9–1.6)	1.2 (0.9–1.6)	1.3 (1.0–1.7)
Self-rated health				
Excellent		5.4 (2.5–11.7)[a]	4.7 (2.1–10.6)[a]	3.2 (1.4–7.4)[a]
Very good		4.7 (2.5–9.1)[a]	4.3 (2.2–8.3)[a]	3.2 (1.6–6.4)[a]
Good		2.6 (1.4–4.7)[a]	2.4 (1.3–4.5)[a]	1.9 (1.0–3.6)
Fair		1.7 (0.9–3.2)	1.6 (0.9–3.0)	1.4 (0.7–2.7)
Poor		1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Functional limitations				
3+ limitations		1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
1–2 limitations		1.9 (1.2–3.0)[a]	2.0 (1.2–3.1)[a]	1.8 (1.1–3.0)[a]
No or only a little limitations		2.3 (1.4–3.6)[a]	2.2 (1.4–3.6)[a]	1.6 (1.1–3.0)

Continued on the following page

clinical samples. Furthermore, most studies on mental health examine mental disorder and dysfunction; understanding correlates of positive mental health among people living with mental disorders can provide important insight into recovery, and the results of this study demonstrate that it is possible to achieve high levels of well-being even while living with a mental illness.

However, several significant limitations must be acknowledged. We do not have accurate information about the current status of the respondents' mood and/or anxiety disorder. When examining well-being, it would be ideal to understand which respondents were currently experiencing symptoms, and which respondents had had a previous episode that had resolved. While we have used functional limitations associated with the mood and/or anxiety disorder as a proxy for current disorder status, this is an imperfect measure.

Problems with sleep, including sleeping more or less than usual, are part of the diagnostic criteria for MDD.[13] It is possible that the differences in well-being we observed according to sleep time in univariate analyses are a function of experiencing a current episode of MDD.

The cross-sectional nature of this survey does not allow us to examine temporal sequencing. This makes it impossible to infer whether well-being influences stress, coping and social support attributes or whether these factors affect well-being. Likely, both are true to some extent. Longitudinal and experimental study designs can help address these questions. However, understanding these relationships in a large, population-based sample is also useful, and can test the generalizability of findings from smaller studies.

Finally, while there is a risk that response bias accounts for some of the observed relationships, the complete absence of significant relationships between self-management behaviours and well-being suggest that this is not the case (i.e. if significant findings were due only to a response bias, then the relationship between self-management behaviours and well-being should have been positive and significant as well).

TABLE 3 (continued)
Logistic regression models predicting high life satisfaction among Canadians aged 18 years and older with mood and/or anxiety disorders

	LS			
	Model 1	Model 2	Model 3	Model 4
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Type of disorder				
Both mood and anxiety		1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Mood only		1.1 (0.8–1.6)	1.2 (0.8–1.6)	1.0 (0.7–1.4)
Anxiety only		1.3 (0.9–1.9)	1.3 (0.9–1.9)	1.1 (0.8–1.7)
Exercise to manage condition				
Started exercising, continued every day			1.5 (0.8–2.6)	
Started exercising, continued 4–6X/wk			1.6 (0.9–2.7)	
Started exercising, continued 2–3X/wk or less			1.3 (0.8–2.1)	
Started exercising but stopped			1.0 (Ref)	
Haven't started exercising			1.0 (0.6–1.5)	
Adopted good sleep habits after diagnosis				
Yes			0.8 (0.6–1.1)	
No			1.0 (Ref)	
No. of hours of sleep (usual) per night				
Less than 6 hours			1.0 (Ref)	
6 hours to less than 9 hours			1.2 (0.8–1.8)	
9 hours or more			1.5 (0.9–2.3)	
Used meditation to manage condition				
Yes			1.0 (0.7–1.4)	
No			1.0 (Ref)	
Perceived stress				
Not at all stressful				1.8 (0.9–3.7)
Not very stressful				2.2 (1.5–3.4)[a]
A bit stressful				1.5 (1.1–2.1)[a]
Quite a bit or extremely stressful				1.0 (Ref)
Coping				
High level of coping				1.9 (1.4–2.7)[a]
Low level of coping				1.0 (Ref)
Perceived social support				
High level of social support				1.9 (1.3–2.8)[a]
Low level of social support				1.0 (Ref)

Abbreviations: CI, confidence interval; LS, life satisfaction; OR, odds ratio; Ref, reference group; Q, quintile; X/wk, times per week.

Notes: Life satisfaction was considered high if participants reported a score of 8 or higher on a scale of 0–10.

Model 1 is the initial model including only sociodemographic variables. Model 2 includes sociodemographic and health and functioning variables. Model 3 includes these variables as well as self-management behaviours. Model 4 includes sociodemographic, health and functioning, and stress, coping and social support variables, but not self-management variables.

[a] Statistically significant at $p < .05$.

Conclusion

When we included sociodemographic characteristics, health and functioning, self-management behaviours and stress, coping and social support in logistic regression models, we found that none of the self-management behaviours were significantly associated with high levels of well-being. Stress, coping and social support, however, were. This finding suggests that healthy coping strategies and strong perceived social support may be important for Canadians with mood and/or anxiety disorders to achieve well-being in the presence of their disorder.

Helping Canadians with mood and/or anxiety disorders to access or build strong social support networks and to develop effective coping strategies are likely important goals, both for mental health professionals and for Canadians experiencing these disorders. Furthermore, a continued focus on the social determinants of well-being, including income, is warranted.

Conflict of interest

None.

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Report summary

Mood and Anxiety Disorders in Canada, 2016

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Purpose of this report

Mood and Anxiety Disorders in Canada, 2016[1] is the first publication to include administrative health data from the Canadian Chronic Disease Surveillance System (CCDSS) for the national surveillance of mood and anxiety disorders among Canadians aged one year and older. It features nationally complete CCDSS data up to fiscal year 2009/10, as well as trend data spanning over a decade (1996/97 to 2009/10). The data presented in this report, and subsequent updates, can be accessed via the Public Health Agency of Canada's *Chronic Disease Infobase Data Cubes* at www.infobase.phac-aspc.gc.ca. Data Cubes are interactive databases that allow users to quickly create tables and graphs using their Web browser. The report demonstrates the Public Health Agency of Canada's commitment to improving data collection and reporting about mental illness, as recommended within *Changing Directions, Changing Lives – The Mental Health Strategy for Canada.*[2]

Mood and anxiety disorders

Mood and anxiety disorders are the most common types of mental illnesses in Canada and throughout the world. Mood disorders are characterized by the lowering or elevation of a person's mood, while anxiety disorders are characterized by excessive and persistent feelings of apprehension, worry and even fear. Both types of disorders may have a major impact on an individual's everyday life and can range from single, short-lived episodes to chronic disorders. Professional care combined with active engagement in self-management strategies can foster recovery and improve the well-being of people affected by these disorders, ultimately enabling them to lead full and active lives.

Canadian Chronic Disease Surveillance System

The CCDSS is a collaborative network of provincial and territorial chronic disease surveillance systems, supported by the Public Health Agency of Canada. It identifies chronic disease cases from provincial and territorial administrative health databases, including physician billing claims and hospital discharge abstract records, linked to provincial and territorial health insurance registries. The health insurance registries capture data on all residents who are eligible for provincial or territorial health insurance (about 97% of the Canadian population); thus, the CCDSS coverage is near-universal. Case definitions are applied to these linked databases and data are then aggregated at the provincial and territorial level before being submitted to the Public Health Agency of Canada for reporting at the provincial, territorial and national levels.

In 2010, the CCDSS was expanded to track and report on mental illness overall, as well as mood and anxiety disorders in the Canadian population. The CCDSS identified individuals as having used health services for mood and anxiety disorders if they met a minimum requirement of at least one physician claim, or one hospital discharge abstract in a given year listing diagnostic codes for mood and anxiety disorders from the 9th or 10th edition of the World Health Organization's International Classification of Diseases. Due to the lack of specificity in the diagnoses and data capture, the surveillance of mood and anxiety disorders as separate entities was not possible. Therefore, the report uses the term "mood and anxiety disorders" to refer to those who have used health services for mood disorders only, anxiety disorders only or both mood and anxiety disorders.

Highlights

- *Mood and Anxiety Disorders in Canada, 2016*[1] provides national annual prevalence estimates of health service use for mood and anxiety disorders over a 14-year period (1996/97 to 2009/10) and by age, sex and geography for the latest year of data (2009/10). It also offers information on the prevalence of comorbidities among those who use health services for mood and anxiety disorders and surveillance challenges specific to these disorders.
- According to key findings of the report, approximately 1 in 10 (3.5 million) Canadians used health services annually for mood and anxiety disorders, and higher rates were observed among adolescent and adult females, middle-aged and older adults and those with other chronic conditions, particularly asthma and chronic obstructive pulmonary disease.
- The report addresses an important knowledge gap by describing health service use for mood and anxiety disorders among Canadian children and adolescents by providing data on those under the age of 15 years.
- The report demonstrates the Public Health Agency of Canada's commitment to improving data collection and reporting about mental illness, as recommended within *Changing Directions, Changing Lives – The Mental Health Strategy for Canada.*

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The CCDSS may capture individuals who do not meet all standard diagnostic criteria for mood or anxiety disorders but were assigned a diagnostic code based on clinical assessment. Conversely, the CCDSS does not capture individuals meeting all standard diagnostic criteria for mood or anxiety disorders who did not receive a relevant diagnostic code (includes those who sought care but were not captured in provincial and territorial administrative health databases and those who have not sought care at all). For these reasons, the CCDSS estimates represent the prevalence of health service use for mood and anxiety disorders, rather than the prevalence of diagnosed mood and anxiety disorders.

Key findings

About three-quarters of Canadians who used health services for a mental illness annually consulted for mood and anxiety disorders. In 2009/10, almost 3.5 million Canadians (or 10%) used health services for mood and anxiety disorders. Although high, the proportion of Canadians using health services for these disorders remained relatively stable between 1996/97 and 2009/10 (age standardized prevalence ranged from 9.4%–10.5%). The highest prevalence was observed among those aged 30 to 54 years, followed by those 55 years and older, while the largest relative increases in prevalence were found among children and youth (aged 5–14 years); in absolute terms, however, these increases were less than one percent.

Adolescent and adult females, especially those middle-aged, were more likely to use health services for mood and anxiety disorders compared to males of the same age. A combination of behavioural, biological and sociocultural factors may explain this sex difference. Males aged 5 to 9 years were more likely to use health services for mood and anxiety disorders compared to females of the same age. This may be explained by the frequent co-occurrence of mood and anxiety disorders with conduct and hyperactivity attention deficit disorders, which are more commonly diagnosed in males of this age.

In 2009/10, Nova Scotia had the highest age-standardized prevalence of the use of health services for mood and anxiety disorders (11.6%), while the lowest was observed in the Northwest Territories (5.8%). Provincial and territorial variations were observed over the surveillance period, including a significant annual increase in the age-standardized prevalence in Saskatchewan, Manitoba, New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland and Labrador, and a significant annual decrease in Ontario. These jurisdictional variations may in part be explained by differences in detection and treatment practices as well as differences in data coding, database submissions, remuneration models and shadow billing practices.

A higher prevalence of asthma and chronic obstructive pulmonary disease (COPD), and to a lesser degree ischemic heart disease, diabetes and hypertension, was observed among people who used health services for mood and anxiety disorders compared to those who did not. While the relationships remain poorly understood, it is well recognized that people with depressive and anxiety disorders are at increased risk of developing other chronic diseases or conditions, and that people affected by chronic physical diseases or conditions are at increased risk of experiencing depression and anxiety.

Future plans

Future work involving the CCDSS related to mood and anxiety disorders includes the ongoing collection and reporting of data on mood and anxiety disorders; developing an approach to study the chronicity of mood and anxiety disorders; and exploring other comorbid diseases and conditions.

Acknowledgements

Mood and Anxiety Disorders in Canada, 2016[1] was made possible by the contributions of both past and present members of the CCDSS Mental Illness Working Group, CCDSS Science Committee, Mental Illness Surveillance Advisory Committee and CCDSS Technical Working Group.

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At-a-glance

Emergency department presentations for hoverboard-related injuries: the electronic Canadian Hospitals Injury Reporting and Prevention Program, 2015 to 2016

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Introduction

The Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP)[1] is an emergency department–based injury and poisoning surveillance system established in 1990 in response to the need for enhanced and timelier injury surveillance information in Canada. The CHIRPP currently operates in 11 pediatric and six general hospitals across Canada and is funded and administered by the Public Health Agency of Canada. The purpose of this report is to provide an overview of hoverboard-related injuries reported to CHIRPP's electronic system (eCHIRPP) as of July 7, 2016.

Methods

A hoverboard is a battery-powered, hands-free, self-balancing two-wheeled vehicle similar to a skateboard, capable of travelling up to 20 km/hour. We conducted a search of narratives within the eCHIRPP database for hoverboard-related injuries on July 7, 2016. Reported events were searched for in the injury event description field using the phrases "hover" and "self" + "balanc" + "scooter". For completeness, additional terms were also considered (e.g. "swagway", "segway", "planche de hover" and "hover planche"). We conducted manual resolution to ensure accuracy and precision of identified events.

Results

The first hoverboard-related injury reported through eCHIRPP was in October 2015. As of July 7, 2016, 35 cases have been recorded in eCHIRPP (Table 1). Cases were equally distributed among males and females. The average age at injury was 12.7 years (SD 5.0). Most of the injuries (N = 20) resulted in a fracture involving the upper arm, elbow, forearm or wrist (Table 2). Of the 35 reported cases, 19 required treatment in the emergency department and further follow-up. The majority of the injuries occurred indoors (N = 23) and in December and January.

Discussion

Hoverboards, a consumer product, were introduced to the Canadian market in June 2015. Our search revealed that most hoverboard use took place close to the holiday season. While our data did not show fires or explosions related to hoverboard batteries as observed in the United States,[2] it is surprising to find a significant proportion of the hoverboards were being used indoors. Their use in confined areas should therefore be avoided, as malfunctioning hoverboards may present a fire hazard. In addition, the use of proper safety gear when riding, including a helmet, knee pads, elbow pads, and wrist guards, is recommended. This will lower the risk of fractures, sprains and other injuries if there is a fall.

Limitations

It is important to note that our sample is not fully representative of the Canadian population. In addition to older teens and adults, Aboriginal persons and people who live in rural areas are also underrepresented in the eCHIRPP database,

TABLE 1
Characteristics of injuries related to hoverboards

Characteristics	Counts
Gender	
Male	18
Female	17
Age (yrs)	
5–9	6
10–14	26
15–19	2
30–39	1
Mean (SD)	12.7 (5.0)
Place of injury	
Indoor	23
Outdoor	10
Missing	2
Area	
Bedroom	2
Hall, foyer	3
Kitchen	2
Dining area, cafeteria	1
Living room, family room, recreation room	5
Basement, cellar	7
Roadway, paved	2
Driveway	1
Sidewalk, path, bus stop	2
Garden, yard	4
Unknown area	6

Abbreviation: SD, standard deviation.

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TABLE 2
Injury characteristics

Characteristics	Counts
Nature of injury	
Superficial, including bruises, abrasions	2
Open wound, including minor cuts, lacerations	1
Fracture	20
Dislocation, including subluxation, spine	2
Sprain or strain, including upper and lower back	2
Soft tissue injury NFS	5
Minor closed head injury	1
Concussion	2
Body part	
Head injury	3
Lower back	1
Shoulder, including scapula	1
Upper arm, including humerus	1
Elbow	4
Forearm, including radius, ulna	9
Wrist, including carpal bones	5
Hand, including metacarpals	1
Finger or thumb	4
Knee, including patella	2
Ankle, including tarsal bones	1
Toe	3
Disposition	
Advice only, diagnostic testing, referred to GP (no treatment in ED)	7
Treated in ED with follow-up PRN	6
Observation in ED, follow-up PRN	1
Observation in ED, follow-up required	2
Treated in ED, follow-up required	19

Abbreviations: BP, body part; ED, emergency department; GP, general practitioner; NFS, not further specified; PRN, pro re nata (as needed).

because most CHIRPP sites are pediatric hospitals located in major cities. Fatal injuries are also underrepresented in the eCHIRPP database because the emergency department data do not include people who died before they could be taken to hospital or those who died after being admitted.

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Carson V, Hunter S, Kuzik N, [...] **Connor Gorber S**, et al. Systematic review of sedentary behaviour and health indicators in school-aged children and youth: an update. Appl Physiol Nutr Metab. 2016;41(6):S240-S265.

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